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Steel Industry Hails Roosevelt Partnership Plan

By CHARLES M. SCHWAB

THE steel industry welcomes President Roosevelt's plan for governmental partnership, declared Chairman Schwab of the American Iron and Steel Institute at its semi-annual meeting in New York on May 24. "The President will have strong support for his plan to assist the nation's business machine through the easing of laws that are unduly restrictive and through substitution of cooperation instead of ruinous trade practices and price cutting," he declared.

Chairman Schwab assured his audience that a "revitalized" institute is ready to function for its membership in carrying out the aims of the industrial control program recently formulated at Washington.

No less unequivocal than Mr. Schwab's stand on this subject was his declaration in favor of voluntary unemployment insurance. He recommended that institute members "give consideration at the earliest possible opportunity to the formulation and adoption of adequate unemployment reserve plans for the protection of their employees in future periods of business recessions."

THE improvement which has come about in the past few weeks has given us all new hope. Current operations of 30 to 35 per cent are still far from what we would like to see; nevertheless, this is more than double the 15 per cent rate which existed a few weeks ago, and the important thing is that the trend is in the right direction.

On March 4 this nation was in a state of chaos. This was followed by a program of action more vigorous and more effective than any other we have witnessed in modern times. The President had the courage to take steps in the direction of balancing the budget and to make certain other forceful moves which were necessary to rehabilitate our economic structure. That restored faith throughout our entire nation, and faith in turn has had its far-reaching influence on our

financial situation. This has led to an improvement of the credit structure, which is the basis of increases in industrial and commercial activity.

I consider it a tribute to our democratic form of government that it has been flexible enough to meet the situation in a critical hour, and I am fully confident that President Roosevelt will use his vast powers sanely and constructively, probably never employing them to the full, and relaxing them as rapidly as the situation will permit.

Business cannot shirk its responsibilities in this situation. As chairman of this institute I am glad to be able to say that we were never in a better position to do our part. Since our last meeting we have had the good fortune to have the Hon. Robert P. Lamont, former Secretary of Commerce, assume the presidency of our



CHARLES M. SCHWAB

institute. The institute's organization and program have been greatly strengthened. Furthermore, under our new set-up, there is an executive committee comprised of steel executives who are lending continuous close counsel in the conduct of its various activities. This should be most helpful in promoting and maintaining the stability of our industry.

I ask the most earnest cooperation of our members in the work of our association, because trade institutions today are being looked to as the spokesmen of their respective industries. Industry must regulate itself wisely and for the public good, if it is to escape regulation from without.

I have said many times that the individual success of our companies is in the end proportionate to our ability to cooperate for the general good. As never before in our business, this belief is about to be put to the test.

President Roosevelt in his splendid address to the country on May 7 invited industry into partnership with the Government to solve its problems. This open-minded pronouncement warrants the admiration of the entire country. The President offers to the business world the facilities and prestige of our Government in eliminating unfair competitive practices with all of their ruinous effects upon prices, wages and profits. In my judgment it would be most unfortunate—indeed

it would be a calamity—for business and employment in this country, if anything were done by legislative fiat to interfere with an orderly and sound restoration of employment. It is, therefore, encouraging to note the President's rejection of Governmental control and the substitution of the more effective proposal of a Governmental partnership. We have had quite enough of restricted production, hours of work and wages during the past three years. What we need now is greater production, more hours of work and expanded income for our employees.

Moreover, we need price stability. The President will have strong support for his plan to assist the nation's business machine through the easing of laws that are unduly restrictive and through substitution of cooperation instead of ruinous trade practices and price cutting. Speaking for the steel industry, I say that we gladly accept this offer of partnership, because with this kind of support and through our revitalized institute we should speedily and effectively be able to see brought into line those selfish interests who persist in unfair practices that are contrary to sound public policy and ruinous to industry.

Sound Profits Basis of Prosperity for All

As I see it, we as an industry can make no greater contribution to the country's total economic well-being than to return our individual companies to a profit basis as quickly as possible. This will not only give us courage to proceed with needed rehabilitation and other deferred plans; but, more important still, it will arrest the downward trend of our employees' purchasing power.

This progress toward profit-making is already under way. Our steel production for the year 1932 of less than 15,000,000 tons descended to levels which even the worst of pessimists would not have predicted two years ago. It is small wonder that the industry sustained a loss of approxi-

mately \$161,000,000 under such circumstances. Now we are steadily emerging from that deep water. In view of the short time in which we have had this improvement, I feel it is too early to forecast ingot production for this year. But it is safe to say that it will be an improvement over last year and there is every indication that we shall look back on 1932 as a record low.

Would Scrap Obsolete Plants

We have had three years of facing stern facts, and we can profit by continuing to be realistic. Let us see straight on our manufacturing set-up. If all the obsolete or semi-obsolete plant equipment were eliminated, that would go far toward strengthening our whole situation. I dare say, if it were possible to appraise fully the struggle to justify obsolete plants, we would find that much of the uneconomic disturbance in American manufacturing today is due to attempts to make "dead horses" pay. It takes courage to scrap a huge investment. We need not feel, however, that in so doing we are admitting a mistake in the past. We are in fact recognizing that conditions have changed and that we are reconstructing our set-up in line with modern demands.

Consumer Goods to Revive Steel

Our steel picture is very materially changing. In the year just prior to and immediately following the war, the steel industry was manufacturing primarily for capital goods,—plants, huge buildings and heavy-production equipment. This will always be a substantial backlog, but its dominance will be less marked. An increasingly important part of our business in the next few years will be in consumers' goods. The public for three years has been doing without thousands of items which enter into our normal standard of living. There is a three-year lag of automobile consumption to be made up. Progress in home building has lagged for even a longer period. The use of steel in many directions has been arrested in its momentum by the hard times.

This emphasis on consumers' goods, with particular demand for quality tonnages, bears out a prediction which I made two years ago that we may see the day when value comparisons may become more and more a measure of our business. It seems quite possible that we may return to the profit-making days of prosperous years without equaling them in tonnage because of the lighter, higher quality steels which are currently in demand.

Predicts More Advertising

I shall leave the subject of marketing to the speakers in that field, but I must observe that the new emphasis on consumers' goods must bring about changes in our methods of selling. There will be more intelligent and more extensive advertising, closer an-

alysis of markets, and a more thoughtful study of extended uses for steel.

I return now to the advances which the steel industry has made in the field of human relationships. The old-fashioned policy of every man for himself and the devil take the hindmost was abandoned by the steel industry many years ago. Our industry throughout this depression has done its utmost to protect the financial status of its workers. I believe that the splendid loyalty of our employees, and the absence of labor troubles throughout these hard times, has been due to a recognition by the employees that management has been doing its utmost in a dire situation.

Long Record of Employee Benefits

We maintained the rate of wages as long as was feasible, maintained it until there were very considerable declines in the cost of living. Our industry was in the forefront in the distribution of work, before the formal organization of the Share-the-Work Movement, and we cooperated to the fullest extent with that movement when it was put into effect nationally. By the adoption of distributed work the steel industry has been able to carry on its rolls approximately 200,000 more employees than would be needed if we had followed the policy of working those whom we retained on a full-time basis. The average working time in the steel plants has been less than 30 hr. per week per man, which indicates the extent to which we have adopted the work-sharing principle.

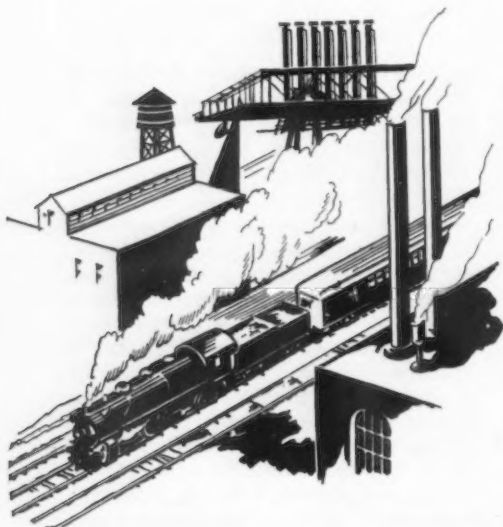
The steel industry has done its part and I believe that this will be fully recognized when the history of these times is written. I could cite a score of instances of company-wide relief plans, employee garden projects, rent concessions, pensions, sickness benefits, all carried on voluntarily and in direct cooperation with representatives of our employees and aggregating many millions of dollars.

I am well aware that the unemployment situation continues to be grave in this country, and that work-sharing is not the whole solution. Part-time incomes are not sufficient for meeting the high standard of living which we have achieved in this country, and which our people will not and should not forego.

As revival has taken place and our production has increased, however, employees who have been working on meager part-time schedules for many months have gotten more employment and better income.

Sees Wide Spread of Prosperity

Moreover, with a return of prosperity for the people as a whole, I believe that we shall see an orderly and effective correction of present unemployment. In our own industry, given a reasonable demand for our products, we shall again absorb our



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quota of the nation's wage earners, affording, as heretofore, employment on reasonable standards of hours and at good wages. The relations between our employees and management are in splendid shape. Our industry has had a long record of paying good wages, affording our employees their fair share of our economic prosperity, as well as enhancing the purchasing power of the public and the ultimate stability of American business. The institute has a responsibility to see that we so conduct our businesses that we may continue to be in the forefront of whatever movements may be necessary for social progress.

We must not neglect this duty. I have cited the splendid work which the steel industry has done in relieving distress among its employees during this depression. Splendid as this has been, however, it is only fair to say that the industry in the main was not prepared to meet the situation as adequately as would have been the case if reserve funds for unemployment had been built up in times of prosperity. As we emerge from the depths of this depression, industry should profit by the experience of the last three years and voluntarily, both as a matter of social justice and sound business, work out with its employees and put into effect plans of unemployment reserves to help meet any future depression.

Legislation should not be required to do this job any more than it has been necessary to assure the introduction of pension and other relief plans. If legislation proves necessary in specific instances, it should be so drawn as not to affect or impair voluntary activity by forward-looking industries. Otherwise, years of progress and voluntary action would be endangered.

We can work out voluntarily in this industry a method of providing reserves commonly called "unemployment insurance" that in the end will be of greater benefit to our employees and society in general than any inflexible compulsory plan which might be forced upon us. I, therefore, recommend that the membership of this institute give consideration at the earliest possible opportunity to the formulation and adoption of adequate unemployment reserve plans for the protection of their employees in future periods of business recessions.

Now for a final word. As a veteran in this business I cannot close these remarks without a word of congratulation to you who are carrying the industry through these difficult times.

The steel industry by its very nature is a peculiarly difficult business for swift adjustments. A steel company cannot get its supplies on the spur of the moment, build or tear down its equipment within a few weeks. It must have large supplies of raw materials and enormous investments in plants covering wide

areas. Such an institution must be built in such proportions during active times, involving an overhead of fixed charges and taxes, which prove extremely burdensome in periods of low operations. The managements of the companies in the steel business have made short-cuts, taken enormous decreases in income, have bought shrewdly and have operated the plants with maximum consideration for the welfare of the stockholders, the employees and the public. If our fixed charges have made it impossible

to earn a profit, we have nevertheless kept our financial structure in reasonably sound condition.

Our eyes are now lifted to the future. The present upturn has done wonders in instilling hope in the heart of everyone. As chairman of this institute, I say that the men of this great industry will tackle the problems ahead with characteristic vigor and enthusiasm. We are ready to go onward and forward with faith in the future of our industry and our country.

Barrel Rack Reduces Oil Storage Floor Space

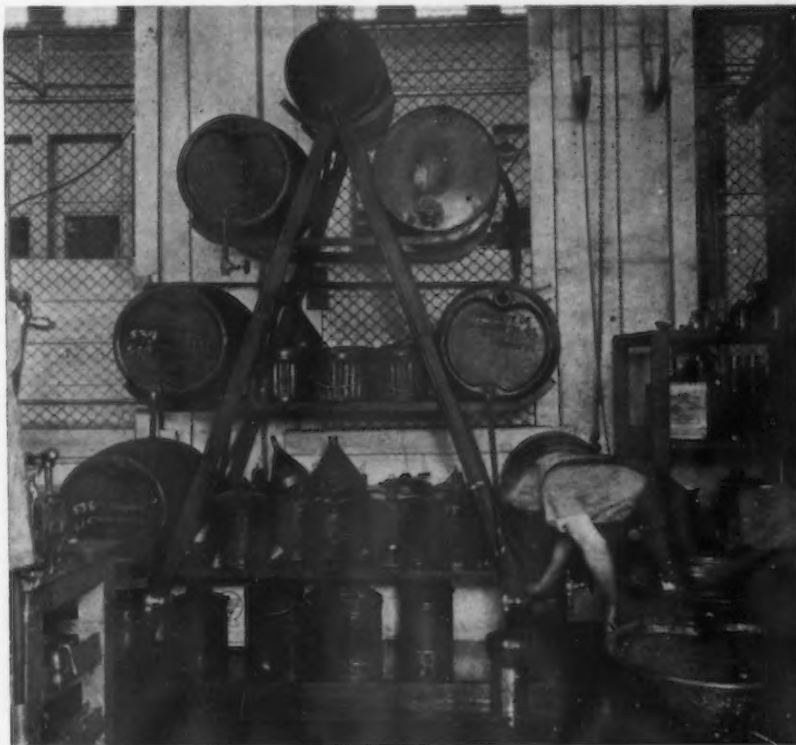
ECONOMY of floor space, lower inventory and a saving in labor have resulted from the construction of an oil barrel rack in the supply room of the machine shop of the Ingersoll Milling Machine Co., Rockford, Ill.

When the subject of the oil barrel rack first came up there was the question of how many barrels it should support. A survey of the needs of the shop found barrels scattered and that more than were needed were in use.

A study of actual needs resulted in the use of only seven barrels, all located on a single rack and their contents all coming from one source of supply. The rack was made from scrap pieces of angles and plates. It consists essentially of two A-frames made of angles. These are spaced about 3 ft. apart and are held by welded cross members.

Extending across each A-frame at three levels are steel angles that extend beyond the legs of the frames. These angles are turned upward at their outer or cantilever ends so that they form supports or cradles for oil barrels. At the top of the frames are saddles for support of a barrel. The capacity of the rack is therefore seven barrels.

Welded to the cross members are horizontal steel plates that form three shelves for the storage of grease buckets and cans. Each barrel is piped to within easy reach of the attendant. Stenciled on the front legs are the designations of the various oils. With barrels in place this rack occupies a floor space 4 ft. wide by 10 ft. long. The total height is about 12 ft. In former practice a floor area 40 ft. x 40 ft. was required for the storage of oil.



This oil barrel rack has conserved much floor space and has greatly facilitated dispensing oil in the shop.

By A. E. BLAKE

Appraisal of Industrial C

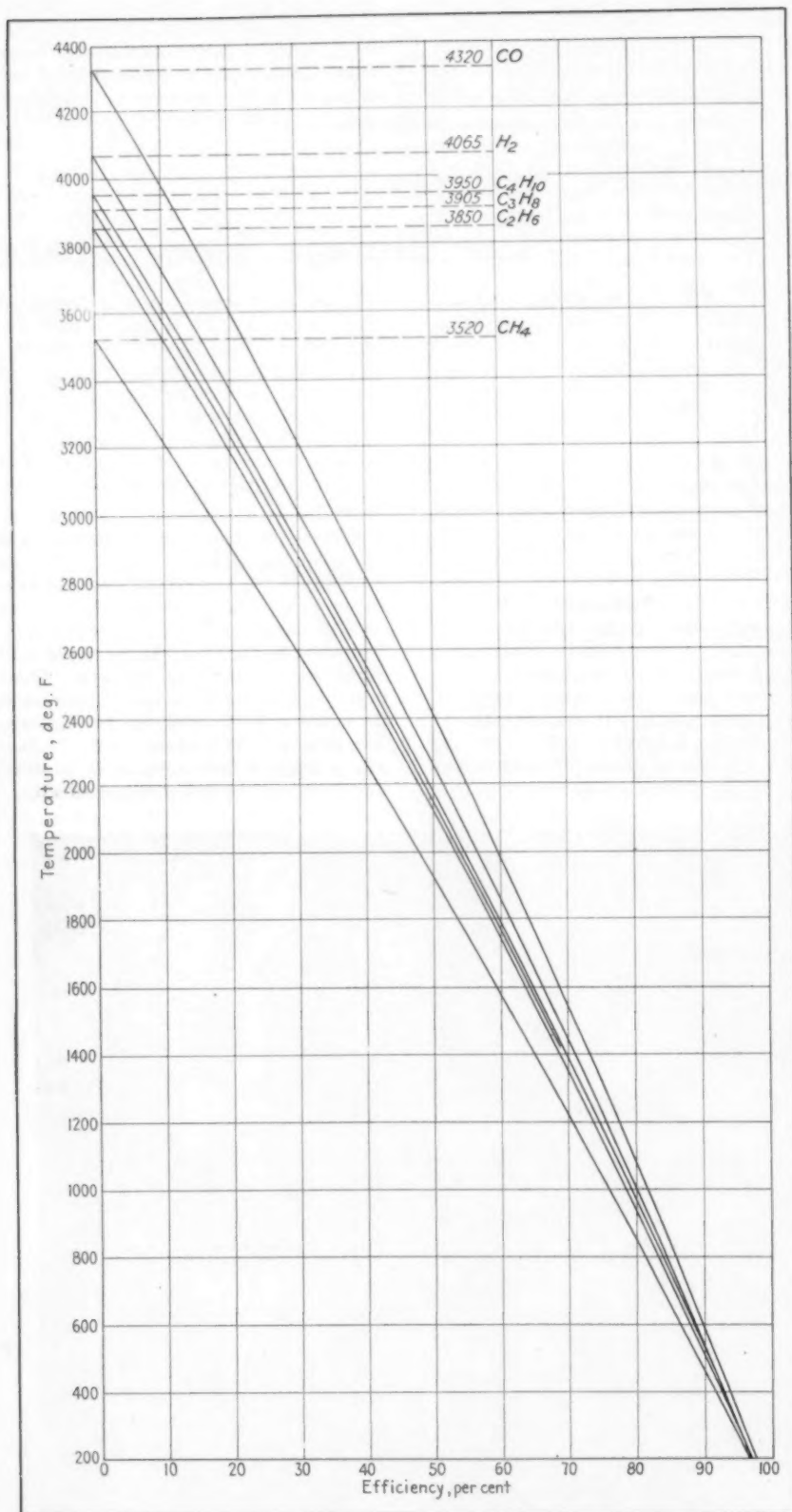


Fig. 2.—Thermal efficiency curves for some of the chief components of industrial gases. For the data reference is made to "Combustion," third edition, of the American Gas Association, Industrial Gas Series, 1932.

IN the accompanying article, which is the concluding part of an unusual exposition of industrial gas fuels presented in THE IRON AGE of May 25, emphasis is placed on the present common practice of attaining either "perfect combustion" or some constant, predetermined degree of oxygen or carbon monoxide concentration in furnace atmospheres. Taken as a whole, the two articles stress the importance of net heat values, rather than gross heat values, for comparison, and outline a rational method of comparing two seemingly very dissimilar gases.

IT has been shown that the combustion engineer has reduced the selection and application of industrial fuel gases to mathematics, founded upon physical and chemical data, and that apparently great differences in quality may have no meaning. There remain a few considerations, however, due to the chemistry of combustion, and of the combustion products.

Table II shows the composition of flue products of quantitative combustion by volume before condensation of moisture, as well as the CO₂ value on a moisture-free basis. Examples of combustion products from oil, coal and coke have been included, on the same quantitative basis. These results of computation for liquid and solid fuels, would need revision for practical comparisons, however. This can be done by using the figures given and assuming the usual percentage of excess air required in ordinary combustion practice for these fuels.

The data presented in this table show the changes of furnace atmosphere which may be expected when a substitution of fuels is made, and permits some prediction of the effects of such changes. The condition of theoretically quantitative and homogeneously mixed air is the only one assumed for these tables, for the sake of brevity, as well as to emphasize the too much ignored fact that gases can be burned with the use of several divergent types of firing equipment, thoroughly and completely standardized, and capable of producing furnace atmospheres of zero oxygen and zero carbon monoxide.

When for any reason, the apparatus is adjusted for providing some

Industrial Gas Fuels

article, part of industry in THE emphasis, either some degree of oxide atmosphere, the importance of the comparison of methanically.

the combustion of industrial chemicals, great difficulties in the consideration of chemistry of combustion.

position of combustion of value on the principles of coal and the same results of solid fuels, practical can be even and the effect of ex-combustion.

s table atmosphere when a and perfect effects of of the homogeneous one as the sake size the uses can eral dipment, standard- ing furnace and appa- some

constant excess of air, or gas, there will be a corresponding change in the furnace atmosphere, including addition of free oxygen, as desired in much of the ceramic work of today, or the addition of carbon monoxide. A point for emphasis is, that whatever the adjustment, the atmosphere produced will be constant to a degree depending upon the constant composition and temperature of the gas used, and assuming absence of draft, there will be a positive pressure in the furnace which will prevent entry of cold air to cause heat loss and introduce undesirable free oxygen.

The results of excess of air or gas upon flue products may be calculated without undue trouble. Excess air is commonly required in the successful burning of oil and solid fuels, contributing to lowered efficiency of heating. After the requirements for any particular minimum of free oxygen, or carbon monoxide, are satisfied, any further departure from "perfect" combustion (0.0 O₂ and 0.0 CO) should be prevented.

It may create some surprise to note the slight variation in nitrogen concentration in the flue gases of these typical fuels, as well as the fact that the value for anthracite gas is lower than that for butane.

The ratio of CO₂ to H₂O in furnace atmospheres varies considerably and is of much importance, owing to the effect of these gases upon metals at high temperatures. The producer gases and solid fuels show low H₂O and high CO₂. This is reversed for high duty gases, especially oven gas. This may explain oxidizing (scaling) effects on metals, when the reaction of metals upon steam at high temperature is recalled. Selection of gas for producing large volumes of inert gas for solvent recovery, or for a source of CO₂ would hardly fall upon the hydrocarbon gases, or oven gas, without unusual inducement as to price.

Coke and bituminous producer gases are somewhat sluggish in burning, due partly to very low hydrogen content. Anthracite gas, with considerably more hydrogen, burns very much as natural gas, and flames of it on "ribbon" burners, even in an atmosphere of wet steam, as in bakery ovens, are very tenacious. Producer gases do not backfire violently when burners are turned off, as some of the high duty gases do. This is another point of resemblance to natural gas.

Fig. II is included as an aid in predicting the effect of a change in the composition of a gas supply. It shows the theoretical thermal efficiency of

TABLE II—COMPARISON OF THEORETICAL COMBUSTION PRODUCTS OF FUELS

	Blue Gas (From Coke)	Water Gas (Carburized)	Butane (100 Per Cent)	Propane (100 Per Cent)	Coal or "Oven" Gas (Stripped)	Natural Gas (W. Va.)	Anthracite Producer Gas (Glen Alden Coal)	Bituminous Producer Gas	Coke Producer Gas	High Volume Bituminous Coal	Low Volume Bituminous Coal	Anthracite Coal (Wyom- ing Rice)	Fuel Oil ^a
CO ₂	17.30	14.37	11.90	11.54	7.83	11.34	17.44	16.17	19.08	22.00	16.50	18.90	15.60
H ₂ O	17.67	16.45	14.88	16.05	22.50	18.01	9.69	8.23	5.80	8.35	5.60	3.24	13.20
N ₂ +SO ₂	65.03	69.19	73.22	72.41	69.67	70.65	72.87	75.60	75.12	69.65	77.90	77.86	71.20
CO ₂ (dry basis)	21.01	17.20	13.98	13.75	10.10	13.83	19.31	17.62	20.25	24.00	17.50	19.53	17.97

¹ See "Steam Power Plant Engineering," Gebhart, 5th Ed., p. 50.

² Ibid., p. 55.

³ Medium Oil; 85 per cent C, 12 per cent H, 0.8 per cent S, 0.2 per cent N, 0.1 per cent O, 0.1 per cent H₂O (Only C and H taken account of; same reference as Note 1, p. 9).

Note: This table has been prepared in answer to doubts sometimes expressed as to the effect of a change of fuel upon stock being heated in industrial furnaces, such as, oxidation of metals and "burning" of steel forgings. It will also assist in selection of fuel for carbon dioxide, nitrogen or inert gas manufacture.

The CO₂ on the dry basis will assist in judging the results of combustion as denoted by flue gas analysis, continuous or intermittent.

Excess air, necessarily used in burning oil and solid fuels, will add oxygen and more nitrogen to the results shown. As to the gaseous fuels, quantitative combustion, with zero O₂ and zero CO has been commercial practice for over 15 years and is now very generally recognized.

Attention is called to the low moisture values (denoting low "hydrogen loss" in combustion, and lessened oxidation activity toward steels) for the three examples of producer gas.

the common combustible components. The influence of increase of ethane in natural gas can be judged fairly close-

ly. The effect of "stripping" natural gas of the small amounts of C₂H₆, C₃H₈, etc., often carried, can be seen.

Steel Panel Construction For Silos and Smoke Stacks

S ILOS made of steel panels offer another outlet for the steel producer. Worden-Allen Co., Milwaukee, has perfected a design that eliminates framework and hoops and which, being of bolted construction, can be readily salvaged.

The panels are made from copper-bearing steel and are of such size and

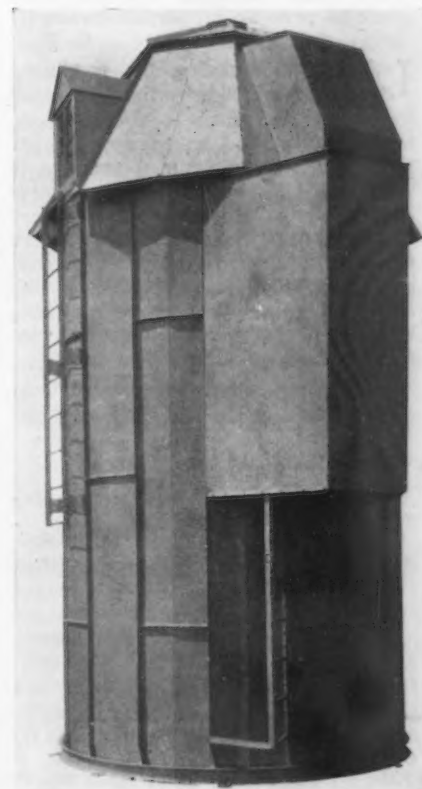
weight that but two men are required on the erection job. They are formed from sheets varying from 14 gage to 5/16 in. in thickness depending upon the size of the structure. The four edges of each sheet are turned up to form flanges which are punched for field connections made on the outside by means of bolts. This type of construction gives a smooth surface on the inside of the silo.

All horizontal joints between panels are broken and all panels of one size are interchangeable. The roof sheets are galvanized. The side sheets are ready for painting on the outside and for special coating inside for protection from acids of silage fermentation.

Advantages claimed for these steel silos are that they are permanent and with reasonable care will last a lifetime. Special equipment is not necessary for their erection. Further, they are fireproof and lightning proof. Tests show that freezing weather has little effect on silage in a steel silo, and it is claimed no trouble is encountered with frozen silage. The construction is such that increased height can be had by removing roof and the top half-panels.

The doors are made of steel and are hinged to swing inside flat against the wall. The doors fit tightly against a steel frame, assuring a positive seal.

Construction very similar to these silos is also being applied to smoke stacks. Advantages are rigid construction and replacement of only such panels as need removal. It is not necessary to take down the entire stack when making repairs.



Putting the Question Mark to Work

— 122 —

Seasoning of Steel Castings

One of our products is a rather complicated steel casting on which we do rough machining. We have had some complaints of warping. Can you tell me whether any change of dimension is apt to take place when green castings are machined and shipped shortly after leaving the foundry floor? Would the difficulty be corrected by seasoning, thus allowing time for a reorientation of crystals? Would annealing or normalizing be advisable after our rough machining?

W. W. M.

OUR experience shows that any steel castings whose dimensions should remain reasonably fixed should be annealed prior to rough machining and, if the casting has varying sections and is not thoroughly tied together, it should be further strain-annealed after rough machining. This will relieve any strains due to machining, which may have caused slight dimensional changes, and the subsequent finished casting should then be stable. Specifically, I should say that in all cases where accurate dimensions are required, annealing or normalizing after rough machining is decidedly indicated.

E. H. B.

In our own experience with steel castings we have found two ways to overcome this warping difficulty. One is to rough machine within $\frac{1}{8}$ in. or perhaps $\frac{1}{16}$ in. and then anneal before finish machining. Our other method is to normalize and anneal before machining.

Union Steel Casting Co.

— 123 —

A Salt Water Alloy

We desire to use aluminum castings below the water line on salt water vessels. We understand ordinary aluminum will corrode. Can you tell us of any simple way of preventing this corrosion?

New England Steel Rack Co.

WE suggest the use of castings of 95/5 per cent aluminum-silicon alloy protected by anodic oxidation, the oxide coating being finally impregnated with lanoline or a bituminous paint. This we feel sure would satisfactorily withstand the action of sea water. It will, however, result in a dark colored surface.

An alternative would be to use unprotected castings of the German K. S. Seewasser alloy which is claimed to stand up well under the corrosive action of salt water. The composition of this alloy, we understand, is:

Manganese	2.5 — 3.0 per cent
Magnesium	2.25 — 2.5 per cent
Antimony	0.2 — 0.5 per cent

The British Aluminium Co., Ltd.

COST OF NITRIDING

HOW can I determine the cost of nitriding? What is the cost of electrodes in the electric melting of cast iron? What should my fuel cost be in annealing? These questions recently received will be answered in early issues. If you have questions or answers please address Forum Editor, Iron Age Publishing Co., 239 West 39th St., New York.

— 124 —

Vibration Tests

We understand some extensive experimental work is being carried on in the field of vibration tests of steel rails. Can you tell us who is doing this?

S. T. R.

SO far we have not made sufficient progress in our vibration tests of rails to warrant publication of results. When these results are available they will be released through the University of Illinois, Engineering Experiment Station, and the joint Advisory Committee of the rail manufacturers and the American Railway Engineering Association.

Prof. H. F. Moore.

— 125 —

Forging Furnace Trouble

I had no trouble tempering small tools in a forging furnace until one day I used this furnace to burn insulation from copper wire. Now, apparently, some chemical reaction takes place to prevent proper tempering.

C. W.

I BELIEVE this trouble is caused by copper vapor which has collected on the work to form an insulating film and so prevent proper tempering. It is common practice to copperplate certain surfaces of steel parts in order to keep these surfaces soft during a heat treatment which tempers the uncoated surfaces. I suggest using a quantity of common salt in the forging furnace to combine with the copper at high temperature and thus remove the difficulty.

W. L. H.

— 126 —

Asbestos-Coated Sheets

Do you know a concern making asbestos coated sheets?

R. S. S.

WE are manufacturing a product consisting of a steel core coated with a special asphaltic compound, hot, over which is bonded an asbestos felt with the edges turned to protect the side edge of the sheet. After this the sheet is corrugated and an additional protective weathering coat is applied.

American Steel Band Co.

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Painting Steel Barrels

We would like some information on the experience of manufacturers in painting welded steel barrels.

C. O. Bartlett & Snow Co.

WE paint our steel barrels and drums by revolving them at the paint station while two operators spray them with spray guns. While rotating, the barrels are supported at the outer edge so that practically complete coverage is secured. The barrels are automatically fed from the drying ovens to the spraying station at predetermined intervals. The two operators, each holding two guns, often cover with two or even three colors with a clear separation.

Atlas Steel Barrel Co.

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Intensity of Illumination

What is meant by 20 ft.-candles in illumination? We want to check up on the intensity of illumination in our plant.

I. S. Spencer's Sons, Inc.

THE foot-candle is a unit of measurement for describing the intensity of light on any surface. It is a factor based upon the candle power of the source of light and the distance of the surface or plane from such source, and it varies inversely with the square of the distance.

A surface 1 ft. away from a source of light of 1 candle power would have an intensity of 1 ft.-candle. Thus an intensity of illumination of 20 ft.-candles would be produced by an 80 candle power lamp 2 ft. away from the surface.

$$\frac{80}{2^2} = 20$$

R. H. J.

— 129 —

Making Hollow Steel Balls

We have a job to manufacture a hollow steel ball. We have noticed in THE IRON AGE that someone makes such a ball by flash welding the joint between two hemispheres. Can you refer us to this manufacturer or to the company making the machinery that does the job?

Doheny Stone Drill Co.,
Torrance, Cal.

WE believe the manufacture of hollow steel balls, as mentioned by the Doheny Stone Drill Co., cannot be described due to the present patent situation. However, we made the welding equipment for this particular job.

Federal Machine & Welder Co.

Titanium in Gray Cast Iron

By GEORGE F. COMSTOCK

Metallurgist, Titanium Alloy Mfg. Co.

OUR methods in this work have been somewhat different from those apparently employed by others who have published reports on alloy cast iron. We do not claim to be experts in the production of high-test cast iron, or even in iron foundry practice. Not having foundry facilities of our own, we have been dependent on various friends in the industry for the actual production of the specimens which we have tested. In most instances therefore we have been obliged to take a kind of iron which was in actual use, and compare its properties with those of the same iron treated with titanium or with other alloys. While we may have missed by this policy the highest possible strength values obtainable with titanium, we feel that something has been gained by keeping the tests on a strictly practical basis, and drawing conclusions only from comparative results with titanium and other alloys on the same iron base.

The titanium alloy used in this work was made to the following specification: Titanium 15 to 20 per cent, silicon 15 to 20 per cent, aluminum less than 1 per cent, carbon less than 0.5 per cent. A typical analysis is as follows: 17.7 per cent titanium, 20.3 per cent silicon, 60.6 per cent iron, 0.3 per cent aluminum, 0.2 per cent carbon, 0.1 per cent chromium, 0.1 per cent phosphorus, 0.07 per cent manganese. For use in cast iron the titanium was generally crushed through a $\frac{1}{4}$ -in. screen. Possibly finer crushing might have been better.

Preliminary Tests

Our first report on the effect of this alloy in gray cast iron came from a large foundry of wide reputation where lumps of the alloy were placed on the top of a small pot of molten iron of about 0.75 per cent silicon content, and stirred in. The solubility of the alloy was reported to be satisfactory, and the addition was said to make the iron hotter and more fluid. Test bars were cast in dry sand. Iron with 2 per cent of the alloy was 23 per cent stronger than untreated iron; the hardness was increased, the deflection decreased, and the microstructure was greatly refined by the titanium addition. An addition of 1 per cent ferrotitanium in iron containing 2 per

cent silicon gave 13 per cent increase in strength.

A test was then made in a small local foundry to see how the effect of 50 per cent ferrosilicon would compare with that of the ferrotitanium. The alloys were crushed through a $\frac{1}{4}$ -in. screen, and placed in the bottoms of hot 50-lb. pots, before iron was poured in. The pots were stirred, and poured in green sand molds to make two test-bars $1\frac{1}{4}$ in. round and 15 in. long, which were tested transversely on supports 12 in. apart. The breaking loads were determined with an Olsen Universal three-screw testing machine of

IN former years considerable ferro carbon-titanium (containing 17 per cent titanium and 7 per cent carbon) was used in cast iron, but comparative tests of the treated and untreated iron seldom showed any difference in strength. Eventually it was realized that this alloy was difficultly soluble in cast iron at ordinary foundry temperatures, so that most of the alloy used in these tests did not really enter the molten iron. The work of Piwowarsky in Germany seemed to show that titanium, if really incorporated in gray iron, would have certain definite beneficial effects, and when an alloy of lower fusion point and good solubility in molten cast iron was developed, further experiments were started with its use in iron foundries. In this and a succeeding article, the author presents the results of these tests.

100,000 lb. capacity, but using a 10,000-lb. poise. The beam was automatically balanced during the test. The deflections were read from a stress-strain diagram plotted by an autographic mechanism on the machine, showing the movement of the lower cross-head between the first application and the release of the load on the bar. The diameter of the broken test-bar was measured at the

fracture, both upright (in the position as tested) and crosswise or horizontally, and the breaking load was then corrected, by means of these measurements, to a strength value for a similar bar of exactly 1.25 in. diameter, using the known relation that the strength of a beam is proportional, other things being equal, to the width times the square of the height. In this way correct strength comparisons were obtained in spite of variations in the sizes of the bars. These methods are explained in detail because they were used for all the tests recorded in this paper with a few exceptions when bars were tested elsewhere.

The results of the tests described above were as follows:

	Corrected Transverse Strength, Lb.	Deflection, In.
Untreated iron.....	{ 3560 3100	0.14 0.11
1 per cent Ferrosilicon added	{ 3080 2550	0.12 0.09
1 per cent Ferrotitanium added	{ 3590 3550	0.12 0.12
2 per cent Ferrosilicon added	{ 2700 3180	0.10 0.12
2 per cent Ferrotitanium added.....	{ 4240 4150	0.15 0.16

The pot to which the last addition was made came from a different cupola-tap from the others, so that although the increase in strength was 26 per cent, the result is not strictly comparable. The other values show quite definitely that the average strength was decreased by ferrosilicon, but increased slightly by the ferrotitanium.

Other tests made in about the same way, treating the iron in small ladles, gave similar results but were not entirely conclusive on account of some uncertainty in regard to the uniform distribution of the alloy when added to the small pots, or the use of too small a number of specimens to represent each kind of iron. These results are therefore reported only in condensed form, in Table I. All these test bars, and those discussed later in this paper, were poured in green sand.

It is noticeable that the results shown in Table I are consistent in that the titanium-treated iron was

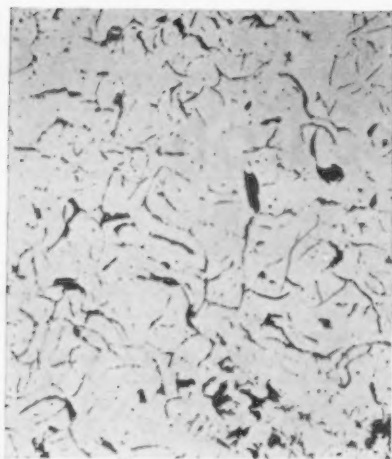


FIG. 1

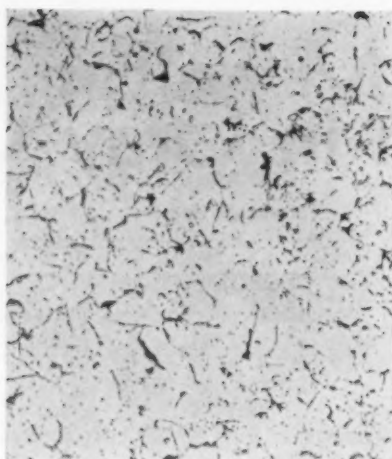


FIG. 2

Fig. 1. Untreated Iron, Showing Coarse Graphite. Fig. 2. Same Iron after Treatment with 1 Per Cent Ferrotitanium. (Both show cross-sections of 1-in. square bars, about midway between center and edge, from Foundry X (see Table I). Unetched and magnified 50 diameters.)

stronger in every instance than the untreated, although in the case of the 0.5 per cent addition and in some of the tests where 1 per cent was used the improvement was almost negligible. The maximum increase in strength from the titanium treatment was from 6 to 17 per cent, but this was not always with the 2 per cent addition.

Titanium Treated Specimens Show Finer Graphite Particles

The structures of most of these specimens were examined with the microscope, and the graphite particles were found invariably to be finer in the titanium-treated iron than in the untreated. Figs. 1 and 2 illustrate this comparison, which was very definite and consistent all through the work. Another feature of the structural comparisons that was nearly always noticeable was a greater proportion of ferrite in the titanium-treated iron, as illustrated by Figs. 5 and 6. This might be expected from the known graphitizing tendency of titanium, since an increase in graphite in an iron not definitely of hyper-eutectoid structure must necessarily result in the formation of more ferrite; but it is rather surprising that in the microscopic study of these specimens this effect of titanium was shown by increased prominence of ferrite, and not of graphite, in the treated iron. The fineness of the graphite in the titanium-treated samples evidently made it less conspicuous on a polished surface, even though there may have

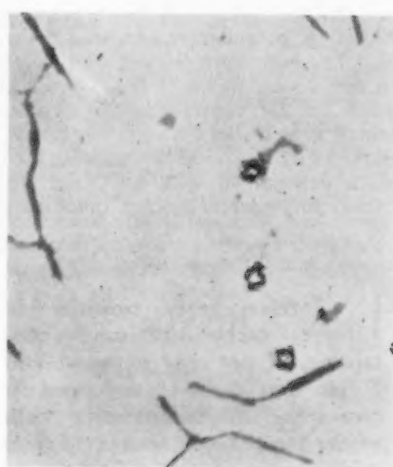


FIG. 3



FIG. 4

Fig. 3. Untreated Iron, Showing Few Titanium Cyanonitride Crystals. Fig. 4. Same Iron after Treatment with 2 Per Cent Ferrotitanium. (Both show cross-sections of 1.2-in. round bars, about midway between center and edge, from Foundry Y (see Table I). Unetched and magnified 500 diameters. The titanium cyanonitride crystals are bright angular spots darkly outlined.)

been actually more of it in the metal.

While discussing the microstructure of titanium-treated cast iron the presence of titanium cyano-nitride crystals should be mentioned. These are very fine hard bright specks, usually angular and darkly outlined on a polished section, and varying in color from pale bluish gray to red or orange. They can be found in almost all cast iron, but are especially numerous when the titanium content of the iron is intentionally increased. Figs. 3 and 4 illustrate their appearance in ordinary and titanium-treated iron, respec-

tively. Probably the effect of these fine crystals on the physical properties is negligible, though there may be a connection between their abundance in the iron and the refinement in the size of the graphite flakes.

More Decisive Tests Using Large Ladles

Advice from our foundry friends, based on their practical experience with alloys in cast iron, indicated that better results would be obtained if the ferrotitanium were added to the iron in large ladles, holding 500 lb. or more, instead of in 50-lb. ladles. Several trials were made therefore in this way, and the results are given in Table II. In Test A the iron was treated by spreading the alloy over its surface when the ladle was partly full; in the other tests the alloy was dropped gradually into the stream of iron in the spout, just as it left the cupola. The latter practice seemed preferable. Six or seven bars of each kind of iron were made in these tests, and the results were averaged. The bars were made 15 in. long, about 1.25 in. in diameter, poured upright in green sand, and tested on supports 12 in. apart, and this applies also to all bars discussed later in this paper. The method used to determine the corrected transverse results was the same as described above, but values adversely affected by serious surface flaws were omitted from the averages. Tensile tests were made on bars machined to 0.8 in. diameter, and threaded at the ends to fit spherical-seated grips so that the stress would be as truly axial as possible. No results were omitted from tensile test averages. Hardness tests were made on cross-sections, about midway between center and edge of the bar as cast, using a 10 mm. ball applied with 3000 kg. load for 30 sec.

These results indicate that, when the alloy was added in large ladles,

TABLE I. TRANSVERSE STRENGTH OF GRAY IRON TREATED IN SMALL LADLES WITH FERROTITANIUM

	Silicon Content of Iron, Per Cent	Average Transverse Strengths in Pounds With				Test Bar Shape	Distance Between Supports, In.
		No. FeTi.	0.5 Per Cent FeTi.	1 Per Cent FeTi.	1.5 Per Cent FeTi.	2 Per Cent FeTi.	
Foundry X	2.5	2890	....	3330	....	3140	1 in. sq. 12
Foundry X	..	3270	3290	....	....	....	1 in. sq. 12
Foundry Y	2.4	2200	....	2300	2390	2570	1.2 in. round 18
Foundry Y	..	3940	....	4040	....	4290	1.25 in. round 12
Foundry Z	2.0	3695	....	3900	....	3905	1.25 in. round 12

a 1 per cent addition was better than 2 per cent. The smaller requirement in the larger ladles was probably because of more thorough melting and mixing than in the small ladles. The microstructures of these samples were interesting in connection with the results obtained. Structures of the pair of irons in Test B are illustrated by Figs. 5 and 6, where the differences in form of graphite and ferrite are well shown. In the irons treated with 2 per cent ferrotitanium there was even more ferrite than shown in Fig. 6, and especially in the one in Test A the ferrite was excessive. This explains the failure to show any improvement in strength for the treated iron in that test; in the high-silicon iron from that foundry (Tests A and B having been made at the same plant) 2 per cent ferrotitanium was too much to

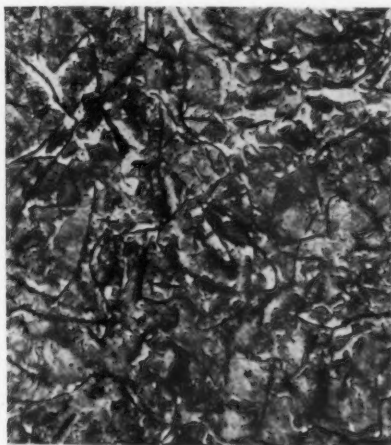


FIG. 5

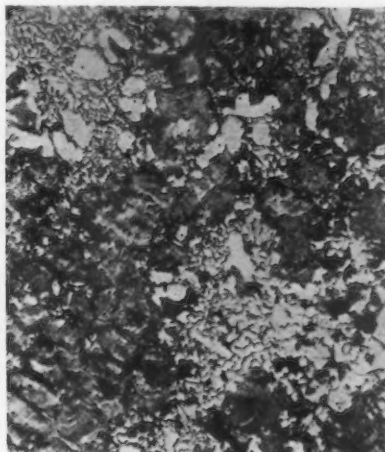


FIG. 6

Fig. 5. Untreated Iron. Fig. 6. Iron with 1 Per Cent Ferrotitanium. (Typical structures near centers of bars 1.25 in. in diameter from Test B (see Table II). Etched with picric acid and magnified 100 diameters, showing finer graphite and more ferrite in the treated iron.)

add, causing weakness from excessive ferrite formation which counteracted the strengthening from finer graphite. Figs. 7 and 8 are submitted to show how the same differences in microstructure, finer graphite and more ferrite, persisted even in $\frac{1}{4}$ -in. sections of the iron used in Test B.

Counteracting Formation of Ferrite

The titanium treatment evidently had a better effect on the lower-silicon iron of Test C than on the iron of Tests A and B, where ferrite was too much in evidence. Since titanium had such a definite tendency to promote the formation of ferrite, the idea arose of combining it with a carbide-forming element, so that they would assist each other in strengthening the iron, but neutralize each other's effects on carbide or ferrite formation. Since chromium is commonly used as a carbide-forming element in iron, with nickel as the graphitizing element to correct the hardening by chromium, it was decided to try titanium and chromium, in comparison with nickel and chromium.

The first test made with these alloys was disappointing because the

cupola practice was such as to give higher total carbon and silicon contents in the iron than were desired. Another test was then made with better results, and in the latter a set of bars treated with molybdenum was included since this alloying element has recently attracted so much attention in cast iron. Results from both these tests are included in Table III as a matter

TABLE II. TESTS OF CUPOLA-MELTED GRAY IRON TREATED IN LARGE LADLES WITH FERROTITANIUM

	Test A		Test B		Test C		
Ferrotitanium added, per cent.	none	2	none	1	none	1	2
Titanium content, per cent.	0.042	0.198	0.060	0.132	0.060	0.087	0.126
Silicon content, per cent.	2.64	2.54	2.64	2.54	2.19	2.00	2.20
Graphite content, per cent.	2.84	2.99	2.84	2.99	2.91	2.77	3.05
Transverse strength, lb.	3,700	3,710	3,492	3,774	3,456	4,291	3,973
Increase over untreated, per cent.	.....	.....	.....	8	.....	24	15
Deflection, inches.	0.106	0.100	0.132	0.134	0.126	0.134	0.127
Tensile strength, lb. per sq. in.	.....	.....	.....	.....	27,200	34,200	30,500
Brinell hardness.	.....	.....	166	163	170	192	179

bars showing flaws being rejected. Tensile test values are averages of five determinations, with no rejections. The test procedure was the same as has been described, except for the machining tests which have not been mentioned before.

The machinability, or cutting-resistance, tests were made for us by Prof. O. W. Boston of the University of Michigan, using his new Tool Dynamometer. Determinations were made with a shaper, a lathe, and a drill press on broken halves of transverse test bars, about $\frac{1}{4}$ in. in diameter and 7 or 8 in. long. The results were obtained as dial readings, indicating the resistance of the metal to cutting under conditions that were kept uniform for all these tests. The values reported are therefore comparative only. The shaper tests were made on iron about $\frac{1}{16}$ in. below the surfaces of the bars at 19 strokes 9 in. long per minute, with feed of 0.013 in. per stroke; the lathe tests were made on the bars, after their diameter had been reduced to 1 in., at a speed of 28.5 ft. per min., with a 0.01 in. depth of cut; and the drilling tests were made with a $\frac{3}{4}$ -in. drill lengthwise at the centers of the bars, at a speed of 153 r.p.m. and 0.012-in. feed, both torque and thrust being determined. The check lathe tests were made 0.1 in. nearer the centers of the bars than in the first tests. Tool-life tests were not attempted, as the samples available were too small.

Samples from Test C, reported above, were the first used for machining. (Concluded on Advertising Page 12)



FIG. 7



FIG. 8

Fig. 7. Untreated Iron. Fig. 8. Iron with 1 Per Cent Ferrotitanium. (Typical structures of castings $\frac{1}{4}$ in. thick, $\frac{9}{16}$ in. from a chilled edge, from Test B (see Table II). Etched with picric acid and magnified 100 diameters, showing finer graphite and a little more ferrite in the treated iron.)

Use of Rolled Steel in Machine Construction

By H. G. MARSH
Carnegie Steel Company, Pittsburgh

A STRIKING change has come over the modern machine shop. Scattered throughout are numerous lights; some are bluish, sputtering ones of great intensity with hooded, ghoulis figures attending them; others are bright yellow, throwing off at times showers of sparks.

These lights mark a new era in machine construction, for two new fabricating processes have been introduced into this industry—flame-cutting and welding. These processes have in turn introduced a new type of construction and a new material, rolled steel.

Flame Cutting a Basic Factor

Flame cutting by the oxy-acetylene or some equivalent process is a far-reaching development in the field of machine construction and it particularly is responsible for the entrance of rolled steel into this market.

Before this process was perfected, the only method of cutting steel was by shearing or machining. Shearing was limited to thicknesses of about $\frac{3}{4}$ to 1 in. where reasonably good edges were required and machining was very expensive. If the contour was irregular, the cost of machining was almost prohibitive.

By flame cutting practically all thicknesses of metal can be cut and with reasonable accuracy. For 2-in. plates the cutting tolerance can be held to plus or minus $\frac{1}{32}$ to $\frac{1}{16}$ in. and for plates or slabs 24-in. thick, plus or minus $\frac{3}{16}$ in.

Practically all steels used in machine construction can be flame cut without injury to the physical qualities of the metal, but in the higher carbon steels they are preheated before cutting and normalized after cutting.

Automatic machines are available for straight and circular cutting and pantographs for irregular shapes.

Almost all metals can be welded. Low-carbon steel is welded with little or no trouble, but as we approach the higher carbon ranges the difficulties increase. Alloy steels must be considered from a viewpoint of the alloys involved, and while they can be successfully welded, each presents a problem of its own. Cast steel is

welded satisfactorily without difficulty.

Mention of rolled steel in a preceding paragraph as a new material for machine construction was made with full knowledge that it has been used to some extent for this purpose for a number of years; but its use has been restricted by the fact it could not be readily cut into irregular shapes and the only methods of fabricating were riveting and bolting. During this period its use was confined largely to frames for conveyors and roller tables, cover plates and small parts of rather minor importance. Irregular shapes and parts of complex construction required that the part be cast. Development of flame-cutting and welding now enables us to produce in rolled steel practically any machine part regardless of its size and shape or complexity.

Knowledge of Available Materials Necessary

A mechanical artist now has a new medium and in order to obtain the best results he must study it thoroughly, just as any other artist must study a new medium. It means a thorough grounding in fundamentals and much practice on simple problems before the more complicated ones can be mastered. Consultation with an expert in this line is advised.

The first difficulty he encounters is the lack of limitations, or rather the greater amount of freedom and flexibility this new medium permits. The tendency is to weld, weld, weld! This is costly and unnecessary and the de-

signer will soon learn to so choose his material that it will require a minimum of welding. In many cases the best welded design is the one with the least amount of welding.

Choice of material is of utmost importance. There are available a great number of rolled sections and a thorough knowledge of them is indispensable.

They include billets, slabs, plates, structural shapes in various forms, bars of all descriptions, pipe, forgings, steel castings and specially rolled sections, which can all be incorporated into the design. There is a great difference in the price per pound of these products and many of them can be had in various grades of steel, so with the wide choice of materials and their varying costs, besides the actual welding, it is not a simple problem to work out the most efficient and economical design for a given job.

Generally speaking, rolled sections are the most economical. Formed sections come next, followed by welded ones. Forgings are usually much higher in cost than rolled steel on a per pound basis, but in many cases they can be used to advantage.

Special shapes are also high in cost, but if the job warrants, they are available, and if sufficient tonnage is involved, the roll cost can be absorbed by the steel manufacturer by a special arrangement.

In submitting inquiries to the steel manufacturers for material for welded construction it is important that sufficient information be given. Surface requirements, flatness, size tolerances and quality all enter into the question of price, and the more that is known about these things the more intelligently the inquiry can be handled. Otherwise the manufacturer might quote on a highly finished plate rolled closely to size and carefully flattened for a part that is to be machined all over and could very well be made from a billet or slab, which would naturally take a very much lower price. Where the material is to be flame-cut at the mill it is also important that full information be given. A complete, detailed drawing of the part showing the proposed machining is desirable.

While there is a great variety of material available, the designer will do well to confine himself to the fewest number of shapes and sizes, as some of the published shapes are not always quickly available. The fewest number of shapes and sizes should serve the greatest number of uses.

Designing for Welded Construction

A most important thing for the designer when first taking up welded construction is to clear his mind of the restrictions imposed upon design by cast construction, such as patterns, shrinkage, flow of metal, etc., as it is desirable if the best results are to



be obtained to take full advantage of the superior qualities of rolled steel.

Replacing cast iron or cast steel with rolled steel, part for part, section for section, results in nothing gainful. It is true something might be saved in weight but it would probably be at the expense of stiffness. It is also likely such a structure would cost more than the casting, due to the excessive amount of welding required. The greatest objection, however, is that the design which may have been an excellent one for cast construction is carried out in a material to which it is not suited, and all the advantages to be gained from the use of the better material are lost.

The best way is to start anew with a careful analysis of the function of the machine and its component parts. The direction and magnitude of the stresses involved should be calculated as closely as possible, their relation to each other studied, and then the best adapted rolled steel sections should be selected and combined in the simplest possible way.

Box Sections Possible With Welded Designs

A designer will soon find that certain devices are now feasible which were practically impossible in cast construction. One of these is the box section, which has excellent resistance, not only to tension, compression and bending stresses, but also to torsional stresses. Rigidity is most essential in machine construction, and as stresses are frequently very complicated and very difficult of analysis, such a section enables him to obtain the required resistance to deflection without resorting to excessive weight.

The design and placing of welds is extremely important. Welds are joints, and any form of joint involves a local concentration of stress. While weld metal is comparable with the parent metal in modern welding, the joint should not be unnecessarily subjected to frequently reversing stresses, shocks or repeated overloads of great intensity. A welded joint whose length is parallel to the direction of stress resists impact much better than one at right angles. A little ingenuity and forethought will usually enable the designer to place welds in favorable positions.

It is also desirable for the designer, who is familiar with all the conditions and requirements of the structure, to determine the welding procedure and so designate it that there will be little left for the welder but to follow instructions. Procedure is just as important in welding as in any other shop process and as long as drawings go to the shop simply marked "weld here" we will have weld failures.

Keep Stresses to Minimum

Welding, regardless of the method employed, requires heat and although this heat is localized, it sets up

stresses which must be relieved. This fact should be ever present in the mind of the designer and also the welder, as it is possible through the proper design and welding procedure to keep these stresses down to a minimum. Such stresses as remain are relieved by two methods: by peening the weld layers thoroughly during the welding process, and by annealing the structure when partially or wholly finished.

In suggesting the designer should forget certain things regarding castings and foundry practice, it was not meant he should entirely forget the foundry's existence. The foundry has its place in the picture, for certain parts can be made cheaper of cast steel than rolled steel. The ideal construction will always be the one which is most economical and still fulfills all the requirements. No objection can be made to a combination of cast steel and rolled steel and the beauty of this fabricating process is that they can be welded together without difficulty.

Our chief interest in any innovation or new development is its effect upon our own industry. The effect of this new method of construction on the steel industry will be far-reaching.

It will enable us to devise better

equipment from a viewpoint of function, service and cost.

A large part of the tonnage now going into castings will be the product of our plate and structural mills. Yesterday we tried to visualize a 15 to 20 per cent conversion; today's indications are that 60 per cent is nearer the correct figure and developments in the near future will possibly force us to again revise our ideas.

Perhaps the most outstanding result of the introduction of this method of construction is the birth of a collateral industrial unit, the "Weldery." Commercial welderies are being established in various districts which will specialize in welded steel construction. From estimates made by those in close touch with this development they offer a potential business of several million tons of rolled steel products annually.

[Comparison of materials for machine construction—rolled steel, cast iron and cast steel—and a summary of the advantages of welded construction are also in Mr. Marsh's interesting paper. More than 30 examples of welded machine members were shown; these included heavy steel mill equipment and four tests illustrating the strength, ductility and impact resistance of welded joints.]

Aging of Mild Steel Sheets

By R. O. Griffis, associate director of research; Reid L. Kenyon, supervising, and Robert S. Burns, research engineers, American Rolling Mill Co., Middletown, Ohio

THERE has been during the last ten years a very rapid extension of sheet metal uses. There seems to be no limit to the demands for better surface, larger sheets, lighter gages, and better physical properties for sheets in the deep drawing field. This being true, any changes in the physical properties which affect the deep drawing behaviors of this product will become evident and will be of great importance in this industry. To point out the truth of this statement, the writers have chosen to pre-

sent first some of the requirements mild steel deep drawing sheets must meet, some of the difficulties which are encountered, and then show representative chemical, structural, and physical characteristics which deep drawing sheets have. Changes in the deep drawing properties resulting from aging will then be discussed.

The way progress is being made in the development of methods of fabrication of deep drawn parts, and in the manufacture of steel sheets for this purpose is of interest because it is so effective. It is something as follows:

The stamping manufacturer sees that, by changing the method of fabrication, certain important improvements and savings can be realized. He may see that drawing half rather than one-fourth of an auto body from one sheet will result in economy. He may have observed that the use of lighter gages will make a more desirable auto body from the standpoint of weight saving, as well as from that of tons of sheet metal used in its manufacture. He may also have observed that a saving in finishing costs and an improvement in appearance will result if the sheet manufacturer can supply a sheet which has and will retain a smoother surface after the drawing operation. The automobile engineers in conceiving of



these savings to be gained from the use of larger sheets, of lighter gages, and improved surface, will make designs and build their dies months ahead of the sheet makers' knowledge and the sheet manufacturer is forced through this procedure to get the desired results quickly.

As a result of these methods of making progress, no combination of laboratory tests is available which will predict the performance of sheet material in a given drawing job, and it is, therefore, the empirical knowledge and experience of the sheet manufacturer which must furnish the guide for the selection of the proper sheets.

The chemical analysis of steel for modern high finish deep drawing sheets has been fairly well standardized. Practically all sheets of this type are made from rimming steel heats, the ladle tests of which fall within the following range:

	Per Cent
Carbon	0.04—0.10
Manganese	0.25—0.45
Phosphorus	Below 0.04
Sulphur	" 0.05
Silicon	Trace

The Rockwell hardness of such sheets may vary within fairly wide limits, depending upon the manner in which they are processed, from B-40 to B-55. The tensile properties are perhaps the best means of estimating a sheet's general characteristics.

Manufacturers of high finish deep drawing steel sheets have realized for many years that aging in the customer's plant has aggravated their breakage and stretcher straining difficulties. It has long been known that the small amount of cold work done by roller leveling will overcome a slight tendency to stretcher strain, but that the effect of this is lost if the sheets are not drawn almost immediately after the leveling operation.

The purpose of the remainder of this paper is to present certain quantitative results of the aging of mild steel sheets. They are typical rather than exhaustive.

It was found that the most important variables in the aging of ordinary commercial mild steel sheets were the amount of cold rolling, and the time and temperature of subsequent storage. In order to study the effect of these three variables, it was necessary to eliminate all the others as completely as possible, and the material selected was, therefore, of a high degree of uniformity from every standpoint, but at the same time representative of the general run of mild steel for deep drawing purposes.

It has been found that the stress-strain curve is a very sensitive indication of the amount of aging which the sheet has undergone. Freshly cold rolled sheets have no sharp yield point and do not stretcher strain, but aging causes a return of both. The higher the amount of cold rolling, the less

the elongation at the yield point after aging [shown by curves in the paper].

In order to study the chronological changes in the physical properties of this material, a series of tests was carried out covering the variables of amount of cold rolling and time and temperature of storage mentioned above. Typical stress strain curves [in the paper] for one amount of cold rolling (one per cent) after aging various lengths of time at each of three temperatures brought out several points of interest: A rise in yield point and tensile strength occurs, and the length of the curves, which represents the ductility, decreases. At each aging temperature the sharp yield point returns at a time depending on the temperature.

The progressive increase in yield point elongation with aging can be observed in the curves but in order to bring this out more clearly another series of tests was made on the same material, cold rolled one per cent and aged at 212 deg. Fahr., but using an extensometer which magnifies the yield point portion of the curves. It is seen [from curves in the paper] that the flat part of the curve or the "yield point elongation" increases continuously and reaches a maximum after about two weeks at this temperature. The severity of the stretcher strains increased on these specimens in a manner comparable to the increase in yield point elongation.

The numerical results of the tensile test as well as Rockwell hardness also gives measures of the aging effect. The changes in these properties on material, cold rolled one per cent, are shown in [curves in the paper]. The relative potency of the different temperatures in causing aging is quite evident; the changes at 400 deg. Fahr. occur much more quickly than those at 212 deg. Fahr. and in turn these are more rapid than those at room temperature. The tensile strength does not suffer as great an increase as the yield point. The Rockwell hardness and per cent elongation also undergo extremely rapid changes at the higher temperatures. The same changes occur at room temperature but require days instead of minutes for their consummation.

Other tests were made on material cold rolled various other percentages and the same general relationships between time and aging temperature were found to hold. These tests showed that the greater the amount of cold rolling, however, the longer was the time required for the recurrence of a sharp yield point, and stretcher straining. Greater amounts of cold rolling can, therefore, be employed to delay the recurrence of stretcher straining, but this procedure can be resorted to in only a limited degree because of the impaired ductility that is also produced by more severe cold working.

Insulation of O

INSULATION of open-hearth furnaces has been suggested by technical writers for a number of years, and studies made and reports published have indicated the possible economies. In most cases writers have said that usual methods of open-hearth temperature control have been too inaccurate to permit of insulation.

This has also been the opinion of most open-hearth operators for many years. About four years ago some plants did insulate their checker chambers, and even in some cases the slag pockets, and one or two operators were venturesome enough to completely insulate a furnace above the floor line, but prior to about six months ago probably only four plants had completely insulated furnaces. There were seven such furnaces in one of these plants, and one each in three others.

Within the last half year at least 20 other plants have completely insulated a furnace—usually only one—and at the present time have these furnaces in operation.

Certain things are bound to happen when silica refractories, operating under the high temperatures in the open-hearth furnace, are insulated so that radiation from the outer surfaces of the brick is greatly reduced. If insulation is applied without recognizing the factors involved, the life of the furnace may be shortened and insulation blamed for the failure.

Two things have been instrumental in bringing about the change in attitude: First, the search for lower operating costs, and, second, four plants were successfully operating completely insulated furnaces. With the heating expense always one of the largest single cost items and with this item increased with irregular rates of operation, operators began to give serious attention to the heat units escaping into the air from the surface of the furnace, and to means for safely converting them into useful dollars. The possibilities were easy to visualize. A few inches of insulation, and much of the radiation stopped. It is not assumed to be within the scope of this paper to differentiate between kinds of insulation.

Since the minimum temperature in

on of Open-Hearth Furnaces

By E. F. ENTWISLE

Superintendent, Saucon Division, Bethlehem
Plant, Bethlehem Steel Co.

the bath at the finish of the heat is at least 2750 deg., and as the maximum safe working temperature of the inner surface of the room is about 2950 deg., it can readily be seen that the temperature differential available for finishing a heat of steel after it is melted is very small. If the inner surface is not maintained above 2750 deg., no steel will be made. If the inner surface exceeds 2950 deg. for more than a short time, brick will be destroyed.

When uninsulated, certain portions of the heat absorbed by the brick are conducted through it and carried away into the air. When insulated, less heat is conducted through the brick because it cannot escape to the air through the insulation, and unless a reduction is made in the quantity of heat input to the furnace, the inner surface temperature of the brick will rise. Thus, it may be considered axiomatic that insulation of a furnace does either of two things:

1. The same temperature is maintained with less fuel input per unit of time, or
2. Higher temperatures are obtained with the same fuel input per unit of time.

Until some economical refractory is developed with safe working temperatures in excess of that of silica brick, and since practically all fast working open-hearth furnaces operate with an inner brick surface temperature approaching 2950 deg. at some time during the heat, it may be assumed that all of the problems involved in insulating a furnace above the floor line occur as per statement No. 1 of the axiom.

[The author here describes the composition and appearance of the four distinct zones, due to the heat, in brick from a 12-in. roof of an uninsulated and an insulated furnace. The results favor the insulated furnace.]

Careful temperature control is essential in an insulated furnace. In one furnace this is being done by pyrometer control of the fuel supply from three couples in carborundum tubes set flush with the inner roof surface. In all other cases the only temperature control is the operator's eye. It must not be overlooked, however, that roof temperature must be more closely guarded than previously, that more damage is done by excess temperature than formerly in the same

length of time, and that the pyrometer control, or at least a pyrometer indicator or alarm to the operator, will result in longer roof life.

[Control of the flame with reduced fuel input, maintenance of flame velocity, and critical temperatures of the brick are covered here. The insulated furnace has certain advantages.]

The amount of insulation must be based on the minimum thickness the brick finally reaches at the end of the furnace campaign. If sufficient insulation is put on the outside of an 18-in. roof to raise the cool end of the brick to 1850 deg., when such a roof wears down to 6 in., the temperature between insulation and outside of brick will reach 2350 deg., which would prove disastrous to the insulation unless it was suitable for service at such a high temperature.

Reference to existing data for the hot crushing strength of silica brick and to roof pressures for various spans and roof thicknesses, removes any fear that, with the relatively high average roof brick temperature obtained with insulation, the roof structure might fail due to lack of strength in the arch itself, provided an inner surface temperature of 2950 to 2975 deg. is not exceeded.

In forecasting the probable fuel savings resulting from insulation or in analyzing the results actually obtained as compared to the same furnace before insulation, it is well to separate the effect of insulation as a preventative of heat radiation from the effect the elimination of air infiltration and more careful flame control have on the fuel consumption. Where close flame control becomes more im-

portant, close control of furnace pressures all through the system becomes of increasing importance, automatic draft control relieves the operating crew of the almost constant attention necessary to manually maintain desired pressure conditions, and even automatic control of the combustion itself is considered desirable by some operators. These conditions in themselves result in lower fuel consumption and are usually coincident with or follow closely the application of insulation, but in fairness to all the factors involved, insulation as a preventative of radiation should not be given credit for the portion of the savings that can be made without it.

The average 100-ton furnace has approximately 2500 sq. ft. of exposed surface above the floor line and 5700 sq. ft. below the floor line, and above ground level, that can be insulated. Additional surface is available for insulation below ground level, but is in the range of the lowest temperatures and the cost of application here would not be justified except in new construction or complete regenerator rebuilds.

The total amount of heat radiated from these surfaces at temperatures that prevail during the making of a heat is approximately 9,000,000 B.t.u. per hr. By insulation this loss can be reduced to 4,000,000 B.t.u., a saving of 5,000,000 B.t.u., or from 8 to 10 per cent of the fuel input. Of this saving nearly 60 per cent is from above the floor line.

Actual operating savings after complete insulation are indicated at from 12 to 25 per cent. The lower total savings are from furnaces previously well sealed and controlled, and the higher savings from furnaces where sealing and control were less carefully done. Insulation of a furnace should prevent the high fuel rates that prevail in uninsulated furnaces towards the ends of campaigns. The heat radiated from an uninsulated roof when worn to 6 in. may amount to 10 per cent of the total fuel input to the furnace. When insulated this maximum loss will amount to only 2½ per cent. Insulation of open-hearth furnaces is just now reaching the proportions of universal application.

First Gain in March Czechoslovak Pig Iron

For the first time in four years, March production of pig iron in Czechoslovakia increased in comparison with the previous month, according to a report from the American consulate at Prague made public by the Commerce Department. March pig iron production totaled 41,052 tons compared with 34,733 tons in February. Production of raw steel in March was 64,613 tons compared with 56,018 tons in February.



Contour Grinder Has Reciprocating Vertical Spindle

A CONTOUR grinder for the rapid and accurate internal and external grinding of irregular shapes has been added to the line of Baker Bros., Inc., Toledo, Ohio.

This machine has a vertical wheel-spindle driven by a vertically-mounted motor which is well protected from grit and dirt. The armature of the motor reciprocates and with it the grinding wheel. The reciprocating motion is actuated by an instantly-controlled independent motor and a cam mounted directly below the spindle. It is said not only to prevent shoulders from forming on the wheel but to give better cutting action and longer service. When dressing the wheel the reciprocation may be stopped instantly by means of the conveniently located snap switch.

The table is at a convenient working height, the maximum and minimum distance from table to floor being 45 and 40 in. respectively. It can be tilted in relation to the wheel for angle grinding and a pointer is provided to facilitate making settings. The table is "in the clear" so that the size of work is not as limited as otherwise.

The grinding wheels, mounted on

special quick-change chucks, may be changed quickly. Four wheels are furnished, two 2-in. face solid wheels and two 2-in. face cup wheels. A wheel dresser with a diamond mounted nib is standard equipment. It is mounted in a T-slot of the table, and with the wheel rotating in a fixed position, the table is moved up and down by means of a capstan handle. A hand-screw attachment is provided for feeding the diamond.

No change in the machine is necessary for internal or external grinding, as the work is simply lifted over the wheel for internal grinding, and

pressed against it for external grinding. The work is visible at all times.

A radius grinding attachment can be furnished for grinding convex radii on the end of rectangular or square section stock or special tool bits. It is mounted in a T-slot on the table. The piece to be ground is clamped in the work-holder block and the radius is ground by rotating it by means of operating handle. Adjustable stops are provided on each side of fixture to allow grinding of arcs of different degrees.

The No. 2 machine illustrated occupies floor space of 16 x 16 in. and weighs 350 lb. Specifications include: Diameter of table, 15 in.; angle setting of table each side of center, 10 deg.; total reciprocation of spindle 3/16 in.

Drum-Type Milling and Center Drilling Machine

THE drum-type milling and center drilling machine illustrated was developed recently by the Newton division of the Consolidated Machine Tool Corp. of America, Rochester, N. Y., for rough and finish face milling and center drilling both ends of

cutters and the center drills. The top bracket carries the arrangement for loosening the clamps on the drum. One head of the machine is adjustable; when it is moved on the housing to accommodate longer shafts, a different type of drum, with the proper fixtures, is substituted, and a top bracket suitable for the width between the heads replaces the one shown.

Six spindles, two roughing and two



The machine has capacity for rough and finish milling both ends and center drilling work from 6 to 30 in. in length. Operation is continuous.

an automobile oil pump bracket. Although designed specifically for these short brackets, the capacity is for work up to 30 in. in length. The machine is suitable for pump shafts, propeller shafts and similar pieces, and can be furnished for work up to 72 in. or longer.

Operation is continuous, the operator being required only to unload and load the fixture. The clamps that hold the work in place on the drum are tightened automatically as the drum revolves and are loosened automatically after the work passes the

finishing spindles for milling and two auxiliary spindles for drilling, are regularly furnished. Chips are disposed of by gravity feed and the cutting lubricant is drained into a reservoir at the rear of the machine. Anti-friction bearings are employed throughout. Centralized lubrication is provided, with drive and feed gears running in oil. Three motors are required, one for the main drive and two for the auxiliary drill spindles. Production is said to range as high as 300 to 400 pieces an hour, depending upon the nature of the work.

Large Heavy-Duty Roll Grinder for Strip and Sheet Rolls

A 60-IN. by 20-ft. roll grinder that combines precision with rapid production, and is large enough to handle backing rolls used in four-high mills, has been built by the Farrel-Birmingham Co., Ansonia, Conn., for a large mid-Western steel mill. The machine is capable of taking heavy roughing cuts and of applying the finest mirror finish surface on rolls for rolling high finish sheets.

Although longer machines of the same swing capacity have been built by the company, the grinder illustrated is believed to be among the largest at present employed. It incorporates new features designed to eliminate vibration, promote increased accuracy of crowning and concaving, as well as straight grinding, and to refinish rolls in the minimum of time.

An improvement stressed as outstanding is the method of driving the roll. Experiments with 32-in. machines, in which the geared heads were replaced with multiple V-belt drives, are said to have proved that a better finish could be obtained when the rolls were rotated through the belts. This led to the adoption of this design for the large machine illustrated, as well as for all other standard sizes.

On this large machine the speed reduction from the motor to the roll is obtained through four multiple V-belt drives, three of which are used at one time. A jaw clutch between the two intermediate drives throws one drive out and the other in, making possible a variable speed range from 6½ to 67 r.p.m. on the roll with a standard 4 to 1 ratio motor.

A backlash eliminating gear added to the patented crowning device automatically eliminates backlash in the gear train that drives the crowning device eccentric and assures exact synchronism between the wheel carriage and wheel when crowning or concaving a roll. The crowning de-

vice eccentric has been moved in closer to the way to give firmer support to the wheelhead and to remove any tendency to vibration at this point. The eccentric and change gears are accessibly located to facilitate settings for any curve.

Standard features include dead center head and footstocks; flexible faceplate drive; angle water-shedding

front bed; centralized controls; flood-lubricated inverted "V" ways; flexible steel covers for the carriage ways and drive rack; double-helical gear to worm and rack traverse drive; and multiple V-belt spindle drive.

Tests before shipment included the grinding of a 14-in. diameter tool-steel four-high mill roll to a mirror finish, and a test with a specially constructed large roll 54 in. in diameter by 106 in. face, weighing 75,000 lb. The shipping weight of the machine is 177,125 lb. Space of 15 ft. 2 in. by 40 ft. 7 in. is required for the foundation.

Automatic Cam Miller

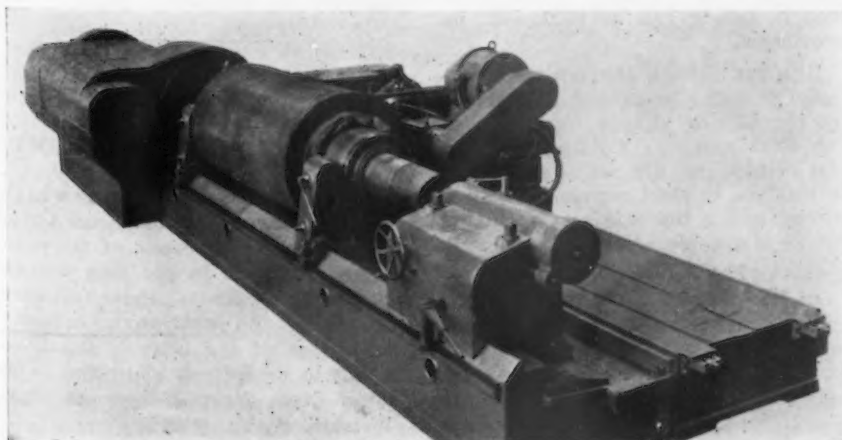
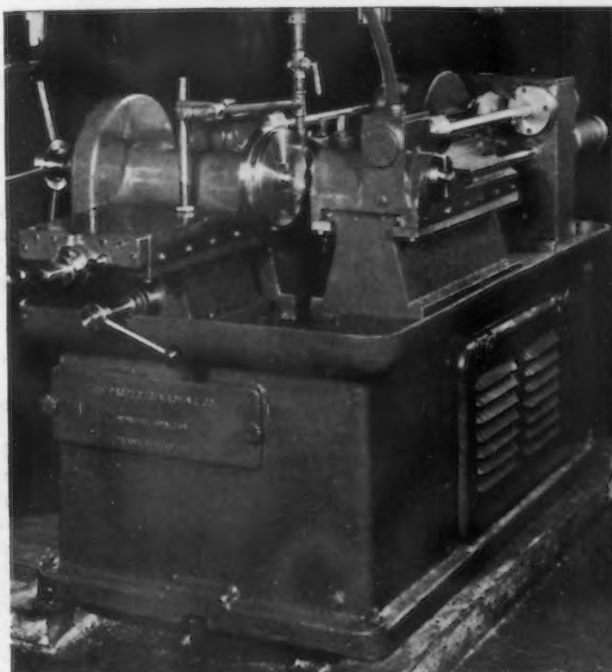
AN automatic cam milling machine with two cutter slides and one work slide so that two paths, surfaces or contours can be milled on the same piece simultaneously has been built by the Producto Machine Co., Bridgeport, Conn. Separate master cams are used to control the

action of the cutter slides, enabling different cam contours to be produced on the same piece of work.

The machine illustrated is used for milling a timing or valve lift cam used on radial-type airplane engine. This cam is about 10 in. in diameter, ¾-in. wide, and has two paths or surfaces to be milled, each path being ¼-in. wide. The surface is milled

(At right)—Two cam paths are milled at one time. On valve lift cams production is at the rate of one piece in 7½ to 8 min.

(Below)—Speed reduction from the motor to the roll is through four multiple V-belts. Another feature of this roll grinder is a backlash eliminating gear for the crowning device.



from a rough forging, and a smooth finish is produced ready for hardening and finish grinding. Each cam path has four lobes.

The machine is fully automatic in operation, making a complete cycle after the operator has thrown the feed lever. The work can be clamped in the work-spindle by a hand-wheel as shown, or by air chucks. Forced feed lubrication is provided for all shafts and bearings.

A separate attachment can be provided to produce the master cam from a sample or model of the work itself. This attachment which is driven by a separate motor permits use of the machine on a wide variety of work and enables the user to make his own master cams.

Distributors Favor Proposed Industrial Control Act

Warehouse Group Adopts Resolution Approving Purpose of Wagner Bill at Annual Conference at New York

THE aims of the national industrial recovery act met with the unanimous approval of steel warehousemen attending the twenty-fourth annual meeting of the American Steel Warehouse Association at Hotel Commodore, New York, on May 23 and 24. The accord was formally recorded in a resolution adopted by the group, which also empowered the association's executive committee to attune its functions for promoting full cooperation with President Roosevelt in the industrial recovery program.

In the opening address on May 23, Guy P. Bible of Horace T. Potts Co., Philadelphia, retiring president of the association, expressed confidence that through the Wagner bill trade associations would be afforded an opportunity to correct many existing trade evils. Of immediate serious concern to the steel warehouse industry, he pointed out, is the unsettling influence of imported steel on domestic prices. Another disturbing factor alluded to by Mr. Bible is the offering of foreign steel as domestic material. This condition could be remedied, he contended, by adoption of a code of practices embracing adequate markings on foreign steel for identifying the country of origin.

He also plead for the association's continued efforts to solve the problem of relationships between mills and distributors. "It has been difficult," Mr. Bible remarked, "to get the proper mill contacts at times. The mills have had their problems, and perhaps ours have seemed small in comparison. One thing is outstanding—the effectiveness of our efforts is in direct proportion to the tonnage we represent. . . . If buyers, both consumers and dealers, would recognize that, when the mills handle small lots at the same price as large lots, the extra cost of this is passed on to the large lot, there would be a sufficient pressure put upon producers to right this condition. We have justice on our side when we say 'make your mill extras fair and equitable and then we will take care of our business.'"

Enactment of the industrial control bill will undoubtedly lead to new and greatly improved conditions in the steel warehouse industry, stated B. R. Sackett, secretary-treasurer of the association, in his annual report. He stressed particularly the provisions of the act for approval by the President of codes of fair competition, for enforcement of these codes by the United States District Courts, and the

provisions authorizing agreements between competitors.

The Wagner measure was given further treatment by A. D. Berning of Ernst & Ernst, accountants, who emphasized the expedience of planning a comprehensive program for meeting Government regulations likely to follow legislation of the bill.

The economic value of the steel warehouse distributor was discussed by W. S. Doxsey, editor, *Daily Metal Trade*, Cleveland, and constructive planning for future warehouse business was the gist of a talk by Ralph J. Stayman, Jones & Laughlin Steel Corp., Pittsburgh.

Speakers at the afternoon session of the first day included Hartley W. Barclay, editor, *Mill and Factory, Illustrated*, New York, and Alexander S. Banks, Leslie, Banks & Co., New York. Presentation of committee reports engaged the remainder of the session.

At the morning session on May 24, a recommendation by the sheet steel committee for quantity extras on less-than-carload shipments aroused a lively discussion. Regulatory measures for governing extras, instead of list differentials, comprise the views of the National Association of Sheet Metal Distributors, according to F. J. McNeive, W. F. Potts Sons Co., who spoke as a delegate of that organization. Mill representatives, who joined in the discussion, suggested that the two associations converge their views on the subject and cooperate toward molding a united policy.

Success of the pending recovery act, in the opinion of E. L. Parker, president, Edgar T. Ward's Sons Co., Pittsburgh, who presented his interpretations of the bill, will depend upon the moral support given it by industries and upon the initiative of business men in taking full advantage of its provisions.

Uniform cutting charges were proposed during a discussion of a report by the cutting charge committee at the final session. Cutting costs, it was pointed out, are out of proportion in relation to steel warehouse selling prices, and a uniform set of cutting extras is considered essential for stabilizing the distributing industry.

At the close of the conference, the following elections were posted: President, C. C. Dodge, George F. Blake, Inc., Worcester, Mass.; first vice-president, Guy T. Bible, Horace T. Potts Co., Philadelphia; second vice-presi-

dent, H. B. Ressler, Joseph T. Ryerson & Son, Inc., Chicago. New members appointed to the executive committee are: (for one year) Henry A. Lowry, Seaboard Steel Corp., Baltimore; (for two years) H. B. Royer, National Bridge Works, Long Island City, N. Y.; (for three years) J. Frederick Rogers, Beals, McCarthy & Rogers, Inc., Buffalo; Charles Heggie, Scully Steel Products Co., Chicago; E. L. Parker, Edgar T. Ward's Sons Co., Pittsburgh.

U.S. Steel Corp. Making "Plykrome"

In order to utilize the advantages which stainless steel provides against corrosion, subsidiary companies of the United States Steel Corp. have developed a stainless clad steel which is now being manufactured under license of the Plykrome Corp.

This is a composite metal with a backing of plain carbon structural steel to which has been permanently bonded a layer of stainless material, offering the same resistance to the various types of corrosion as is assured by stainless steel. This new product will be available at a price which will permit its general adoption in all cases where corrosion resistance is essential only on one side of plates, sheets, sheet bars, strips, etc. The base of this material being of mild steel it responds readily to various forming operations equally as well as that of mild carbon steels.

While the veneering of steel with corrosion resisting metals is not a new art, extensive experimental work has been necessary in developing a stainless clad product which will maintain a permanent bond under severe conditions of heat, particularly where fabricating operations are involved. "Plykrome" is said to meet these conditions quite as satisfactorily as the solid stainless steel in the varied installations where it can be used.

A detailed description of "Plykrome," at the time of its introduction was given in *THE IRON AGE* of Aug. 20, 1931, on page 503.

National Steel Starts Lake Shipping Season

Reflecting improving business in the steel industry, National Steel Corp. is starting four vessels of its Great Lakes ore fleet in the iron ore and coal carrying trade. These will carry ore from the company's extensive properties at the head of the Great Lakes to its Detroit plant and to the lower lakes for rail shipment to its Weirton, W. Va., plant.

Steel Industry Prepares for United Action

Institute Meeting Begins New Chapter in the History of Steel

MARKED by keen interest and an attendance of 1400, the forty-second general meeting of the American Iron and Steel Institute, New York, May 25, promises to mark the beginning of a new chapter in the history of steel.

Paramount in the minds of all attending the meeting, of course, was the subject of the Industry Control Measure and its relation to America's largest basic industry. Any doubts which may have existed as to the inclination of the industry to wholeheartedly fall in line with the Administration's plans for recovery were thoroughly dissipated, not alone by the tenor of the formal addresses, but by the overwhelming unanimity of sentiment expressed privately by the membership. It may confidently be said, that not merely will the steel industry fall in line with President Roosevelt's program, but that it will be found in the vanguard of the procession and will set an outstanding example to industry and business as a whole.

Quick Action Expected

The intention of the industry is shown by the intensive and quick follow-up of effort in planning action represented by a general meeting of the chief executives of all steel producing companies, which was held the day following the Institute meeting and at which the membership formally empowered the executive committee to consult with Administration authorities and to proceed to develop the plan of action to be taken by the industry. Executive meetings are being held this week for that purpose.

Charles M. Schwab, chairman of the Institute, opened the meeting with an address which appears as the leading article in this issue of *THE IRON AGE*. Mr. Schwab made an eloquent plea for the "most earnest cooperation" of the membership in the work of the Institute, because, as he said, "trade institutions today are being looked to as the spokesmen of their respective industries."

"The belief is about to be put to the test," said Mr. Schwab, "that the individual success of our company is in the end proportionate to our ability to cooperate for the general good."

The necessity of scrapping obsolete plant equipment, the increasing importance of consumer goods in the future picture of steel demand, the necessity of more intelligent advertising and the need for the industry to

set up unemployment reserves were individual high points in Mr. Schwab's address.

Francis H. Sisson, vice-president, Guaranty Trust Co., New York, addressed the membership on "The Financial Situation and Its Relation to Business Recovery." "For the time being at least," said Mr. Sisson, "Washington has usurped the place of New York as the center of the American economic stage. And there is some reason to believe that this shift is more than temporary."

Mr. Sisson pointed out the difficulty in arriving at satisfactory conclusions regarding the significance of current business and financial conditions as it is at present, because of the rapid and radically changing picture. "No sooner does the observer get himself mentally adjusted to one set of conditions," said Mr. Sisson, "than he finds himself face to face with another."

"The National Industrial Recovery Act carries business into politics with a vengeance," said the speaker. "Can the administration of this huge program be kept free from corruption, favoritism, oppression and the appeals of the demagogue? Will the combined wisdom of industrial executives and political appointees be equal to the task of providing an adequate substitute for the law of supply and demand?"

The near-term outlook for business is regarded by Mr. Sisson as definitely favorable, in the sense that either the present recovery will continue along natural lines or, if it does not, it will be bolstered by currency and credit manipulation.

Kettering Tells About Research

Charles F. Kettering, president, General Motors Research Corp., New York, next spoke upon the subject of "The Use of Research in Industrial and Commercial Progress."

"Research," said Mr. Kettering, "may be based upon several different factors. For example, it has been used in some cases primarily as the basis for developing advertising. Again, it may have its chief purpose as the instrumentality for the correction of present troubles. Again, it may be directed toward the ascertainment of future trends and, hence, the forward look."

Concerns adopting research activities usually expect too quick results, according to Mr. Kettering. It cannot be put upon a profitable basis in a short time, and the immediate profit

motive is not likely to develop successful research.

Speaking of specific technical research as distinguished from market research, Mr. Kettering said that in his experience about 40 per cent of the time of the research organization is applied to the product as it is today. By this he indicated the necessity of close contact and cultivation of the producing organization. "This time spent by research men in the plant," said Mr. Kettering, "might really be classed as a social function, but it is necessary because resistance to change on the part of the producing department is generally the switching point. Advance problems may be said to take up an additional 40 per cent of the time of the research department, while 20 per cent is about a fair allotment to what we might call speculative problems."

Robert P. Lamont, president of the Institute, discussed the terms of the National Recovery Act, calling attention to the probable unconstitutionality of the proposal to license industries and to the "serious omission" represented by the lack of a provision in the bill to offset low wage and long hour competition from abroad with products made in this country.

Technical Papers Presented

At the afternoon session, which was devoted to technical subjects, H. G. Marsh, of the Carnegie Steel Co., Pittsburgh, delivered a paper on the use of rolled steel in machine construction. Research engineers of the American Rolling Mill Co., Middletown, Ohio, presented a study of the aging of mild steel sheets. E. F. Entwisle, superintendent, Saucon division, Bethlehem Steel Co., Bethlehem, gave a paper on the insulation of open-hearth furnaces. These three papers and discussions, are abstracted at length elsewhere in this issue.

Senator Joseph T. Robinson, majority floor leader of the Seventy-third Congress, made the principal address at the banquet of the Institute at Hotel Commodore, Thursday evening. Chairman Charles M. Schwab presided at the speakers' table, and in addition to introducing the speaker of the evening, presented the Gary Memorial Medal to Willis L. King, vice-president of Jones & Laughlin Steel Corp., and the Institute Medal to Clarence B. Randall, vice-president of Inland Steel Corp.

Mr. King received the Gary medal in recognition of "his outstanding achievement as a leader in inspiring high ideals and promoting confidence and good will in the welfare of the iron and steel industry."

The Institute Medal, which was presented to Mr. Randall was awarded to him for his paper entitled "Mining Taxation in the Lake Superior District," which was delivered by him before the Spring meeting of the Institute in May of last year.

PERSONALS

CHARLES R. BROWN has been elected president and general manager of the Canadian Drawn Steel Co., Ltd., Hamilton, Ont., succeeding the late H. J. Waddie, founder of the company.

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HARRY R. JONES has resigned as president and director of the Ohio Ferro Alloy Corp., Canton, Ohio.

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CLYDE L. WAY has been appointed St. Louis representative, with offices at 608 Security Building, by the Synthane Corp., Oaks, Pa., maker of Synthane laminated bakelite.

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E. Q. SMITH, of the Bundy Tubing Co., Detroit, has been elected vice-president of the Detroit chapter of the National Association of Cost Accountants.

♦ ♦ ♦

GEORGE H. ZOERB, Sharpsburg Foundry Co., Sharpsburg, Pa., was elected president of the Pittsburgh Foundrymen's Association at the annual meeting held on May 22. C. E. DAVIS, Homestead Valve Mfg. Co., Coraopolis, Pa., was named vice-president, and WILLIAM J. BRANT, Pittsburgh, will continue as secretary-treasurer. T. A. REYNOLDS, McConway & Torley Corp., Pittsburgh; S. B. CUTHBERT, Carnegie Steel Co., Braddock, Pa.; H. P. SPILKER, Sterrit Thomas Foundry Co., Pittsburgh; F. C. T. DANIELS, Mackintosh-Hemp-hill Co., Pittsburgh, and the late H. F.

SEIFERT, Westinghouse Electric & Mfg. Co., East Pittsburgh, were made members of the executive committee.

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H. T. WOOLSON, chief engineer Chrysler Corp., Detroit, has been elected chairman of the Detroit section of the Society of Automotive Engineers. D. A. WALLACE, vice-president Chrysler Corp., has been named vice-chairman in charge of production activities.

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FRED E. WOLF, who has had long engineering and sales experience in connection with blast cleaning and dust collection equipment, has been appointed sales engineer for the Pittsburgh district for the W. W. Sly Mfg. Co., Cleveland.

♦ ♦ ♦

HARRY WOODHEAD, who has been sales manager of the Cleveland plant of the Truscon Steel Co., Youngstown, Ohio, has been appointed general manager of that plant. He has been a vice-president of the company and continues in that capacity.

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DR. R. S. HUTTON, Goldsmith's professor of metallurgy, University of Cambridge, Cambridge, England, will deliver the Faraday centennial address at a meeting of the Electrochemical Society to be held in Chicago, in connection with the Century of Progress International Fair, on Sept. 7, 8 and 9.

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dry and Micarta division, Westinghouse Electric & Mfg. Co., East Pittsburgh, died suddenly at a meeting of the Pittsburgh Foundrymen's Association at the Fort Pitt Hotel, Pittsburgh, on May 22. Mr. Seifert had the principal paper at the meeting on "Non-Ferrous Foundry Melting Practice." He was a past-president of the association, and a member of its executive committee.

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PETER M. LOUWERSE, district manager at Chicago for the Truscon Steel Co., died May 27 at his home at Arlington Heights, Ill. He was a veteran of the Spanish-American war, having served under Theodore Roosevelt at the San Juan Hill engagement. Before serving the Truscon company he had been city engineer of Grand Rapids, Mich.

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LOUIS A. HOERR, who rose from the position of draughtsman to president of the Western Railway Equipment Co., St. Louis, died in a hospital there last Friday at the age of 57 years. He also was president of the Midvale Mining & Manufacturing Co., the

Railway Devices Co., the St. Louis Rose Co. and the St. Louis Wholesale Cut Flower Co., vice-president of the John Kilburz Pattern Co. and of the Copper Clad Malleable Range Co., and a director of the United Bank & Trust Co.

Mr. Hoerr was born in Denison, Tex., whence he came in his boyhood to St. Louis with his parents. Following graduations from the old Manual Training School, he entered the railway supply business as an employee of the Brownell, Wight Car Co., later going to the Western company.

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DEAN G. KIMBALL, president of the Walcott Machine Co., Jackson, Mich., died on May 22 following several weeks' illness. In 1915 he became affiliated with the Walcott & Wood Machine Co., which later became the Walcott Machine Co. He also was president of the Crankshaft Machinery Co. of Jackson. He recently resigned as chairman of the City Welfare Committee of Jackson. He was 66 years old.

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HERBERT I. LORD, first vice-president and treasurer of the Detroit Lubricator Co., Detroit, died on May 25. A graduate of the Massachusetts Institute of Technology, he early was associated with the American Radiator Co. at Chicago and in 1907 became affiliated at Detroit with the Detroit Lubricator Co. He was 57 years of age.

A. F. A. Medal Awarded to Guillian H. Clamer

It is announced by the board of directors of the American Foundrymen's Association, acting on recommendation of the board of awards, that the Joseph S. Seaman Gold Medal of the Association has been awarded to Guillian H. Clamer for outstanding achievements in the metal casting industry. Presentation of the medal will be made during the 1933 Annual Convention in Chicago, at the annual business meeting June 22.

Mr. Clamer has been associated with the advancement of metal casting, particularly non-ferrous metals, for nearly 40 years. Under his executive direction many valuable improvements in melting and casting practice have been developed. Constantly active in the activities of technical societies allied with the foundry industry, he is a past-president of the American Foundrymen's Association and a life member of the advisory board.

Edgewater Steel Co., Pittsburgh, announces the appointment of H. F. Lowman, 912 Investment Building, Washington, as its representative in that territory, effective June 1.

OBITUARY

HARRY E. McLAIN, president of the McLain Fire Brick Co., Pittsburgh, died on May 25 at his home in that city. He was born at New Castle, Pa., in 1868, and had been identified with the refractories industry during the greater part of his business career.

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HARRY H. CUTLER, co-founder Cutler-Hammer Mfg. Co., now Cutler-Hammer, Inc., Milwaukee, died May 21 at Miami, Fla., aged 73 years. He was a pioneer in the field of electrical control and during his career was granted 76 patents. He established the Cutler-Hammer business in Chicago in 1893 and several years later moved it to Milwaukee in a merger with the American Rheostat Co. He disposed of his interest in 1917 and returned to his former home at Boston, continuing his research in electrical controlling devices as well as gas and oil engine accessories. Two years ago he retired and moved to Florida.

♦ ♦ ♦

H. F. SEIFERT, superintendent foun-

OFF THE ASSEMBLY LINE



Seasonal Decline in Automobile Sales Likely to Be Slight

DETROIT, May 29.

WITH automobile production continuing on a basis of about 200,000 cars a month, a pace which 60 days ago seemed improbable of attainment at any time this year, the question is being asked both inside and outside the industry, "How long will this last?" Manufacturing activities are directly depending for support upon retail sales, and a comparison of new car registrations during May, June and July in recent years may give a clue to the likely trend of the retail automobile trade in the next two months.

Last year may be dismissed as abnormal for two reasons: June showed an 11 per cent increase over May because of heavy sales of the new V-eight Ford car and because in the latter part of that month the federal excise tax took effect, pushing sales which normally would be made in July up into the first 20 days of June. Consequently, July sales dropped off 30 per cent from those in June, a decline far greater than in other years. If 1932 be omitted, a comparison of the five years from 1927 to 1931 inclusive reveals some surprising figures which do not conform to the conventional idea of a considerable seasonal tapering off in business during June and July. The loss in June as against May averaged only 12 per cent, while July brought a gain of 1 per cent over June. In other words, retail deliveries in July were better than those in June in three of the five years, the only losses having been 3 per cent in 1931 and 6 per cent in 1927.

Heavy Factory Schedules Expected

If June and July of this year merely conform to the average performance of recent years, production will be maintained at a relatively good rate. However, there are signs that retail sales will continue without slackening much their recent pace, thereby assuring factories of heavy schedules in June. A prominent manufacturer, always inclined toward conservatism in surveying the demand for its product, is anticipating a 10 per cent drop

in sales during June as against those in May and a further decline of 18 per cent in July compared with June. The chances are good that the decrease will be far less than these projected figures indicate. Fortunately the automobile industry has not let the favorable turn of events in the past two months run away with its ordinary good judgment and it is not predicting that June will bring a further upward turn in sales. It privately expresses the opinion that May was the peak month of the year, that June will be a good month with the decline only of slight proportions, and that July should see sales and production sustained at a comfortable level, although diminished somewhat as compared with June. Even August looks pretty good at this distance.

Demand Represents All Regions

For a long time the Atlantic seaboard, particularly New York and the New England States, has had a corner on the retail motor car market. Sales in that region have been far ahead of those in other parts of the country. One of the interesting and encouraging developments of the last month is that week by week the eastern region's percentage of total national sales has slowly but steadily fallen, indicating a renewal of buying in other regions. Improvement has been particularly notable in the Mississippi Valley from St. Louis south and in the South from Georgia west to Texas, an enormous agricultural area which for the last two years has been exceptionally barren ground for automobile sales. In fact, there is no section of the United States in which retail sales have not shown a marked gain in the last 30 days.

Chevrolet's output in May is now expected to be about 72,000 cars. The local gear, forge and axle plants have been operating two 12-hr. shifts the past week, extending their usual five-day week to six days, in order to be able to shut down Saturday night until Wednesday morning for the Memorial Day holiday. June production is likely to be 65,000 units. The

fact that Chevrolet is not turning out any of its 107-in. Standard series has led to the unfounded story that it intends to drop this car. The truth is that this series was added to the line primarily for the fleet trade and fleet owners have not yet shown much interest in making replacement purchases, despite the pick-up in sales to the general public. The standard car will be retained to appeal to commercial buyers who place orders strictly on a basis of the lowest efficient operating cost.

Plymouth is not stopping during the week-end holiday because of the heavy demand for its cars. It set a record last Wednesday by making 1500 cars, the largest single day's production in its history. Dodge also is operating at a high rate. Chrysler Corp. is said to have tentatively scheduled 40,000 cars for June. Ford's program in June calls for about 45,000 cars, with a considerable reduction from that figure anticipated in July. Ford bought a small tonnage of steel the past week and is expected to give further releases this week. Hudson-Essex sales are more than keeping pace with production, the factory being two weeks behind in delivering certain models. Graham-Paige will turn out about 1250 cars this month. Willys-Overland has secured court permission to continue building a limited number of light trucks and of its Willys 77 passenger car until August.

Detroit Notes

A leading pig iron dealer reports May shipments to foundries in the Detroit district 30 per cent ahead of those in April. . . . Murray Corp. has orders on hand for over 100,000 of its new insulated steel beer barrels. Employment in its barrel department has been increased from 400 to 800 men; its steel requirements for barrels will run from 150 to 500 tons a week. It is now employing 6200 men at its seven plants, two shifts daily being engaged in manufacturing motor car bodies. . . . Bohn Aluminum & Brass Corp. is operating two of its plants 24 hr. a day, one plant 18 hr. and another 12 hr., five days a week.

Provisional Program for Chicago Meeting Issued by A. S. T. M.

IN its bi-monthly *Bulletin* for April 29, 1933, American Society for Testing Materials issues a detailed provisional program for its forthcoming thirty-sixth annual meeting, to be held in Chicago, June 26-30.

The opening session, on the morning of June 26, will be held jointly with that of the American Foundrymen's Association. The program of the latter organization was published in *THE IRON AGE*, May 11, page 749.

On the evening of June 26, award will be made to Samuel Epstein, metallurgist, Battelle Memorial Institute, of the Charles B. Dudley medal for the paper "Embrittlement of Hot-Galvanized Structural Steel." This was presented before the society at its last annual meeting.

Among the many papers and reports to be presented at the various sessions of the meeting, the following are of particular interest to the metal-working industry:

Monday, June 26, 2 p. m.

Cast Iron, Effect of Temperature on Metals

- Report of Committee A-7 on Malleable Iron Castings. W. P. Putnam, chairman.
- Report of Committee A-3 on Cast Iron. Hyman Bornstein, chairman.
- Informal Report of Sectional Committee on Specifications for Cast-Iron Pipe and Special Castings. T. H. Wiggin, chairman.
- Report of Joint Research Committee of A.S.M.E. and A.S.T.M. on Effect of Temperature on the Properties of Metals. H. J. French, chairman.
- Creep and Structural Stability of Nickel-Chromium-Iron Alloys at 1600 deg. F. (870 deg. C.). W. A. Tucker and S. E. Sinclair, U. S. Bureau of Standards.
- Studies on Creep of Metals Using a Modified Rohn Test. C. R. Austin, Westinghouse Electric & Mfg. Co.

Tuesday, June 27, 9:30 a. m.

Steel, Wrought Iron

- Report of Committee A-4 on Heat Treatment of Iron and Steel. J. H. Hall, vice-chairman.
- Report of Committee A-6 on Magnetic Properties. Thomas Spooner, chairman.
- Report of Committee A-2 on Wrought Iron. H. W. Faus, chairman.
- Report of Committee A-1 on Steel. H. H. Morgan, chairman.
- Report of Sectional Committee on Standardization of Dimensions and Material of Wrought-Iron and Wrought-Steel Pipe and Tubing. H. H. Morgan, chairman.
- Shearing Properties and Poisson's Ratio of Structural and Alloy Steels. Inge Lyse and H. J. Godfrey, Lehigh University.
- The Torsion Impact Test. G. V. Luerssen and O. V. Greene, Carpenter Steel Co.
- Informal Report of Joint Committee on Investigation of the Effect of Phosphorus and Sulphur in Steel. H. S. Rawdon, acting chairman.

Tuesday, June 27, 3:30 p. m.

Elighth Edgar Marburg Lecture: "Crystal-line Structure in Relation to Failure of Metals Especially by Fatigue," by Dr. Herbert John Gough.

Thursday, June 29, 9:30 a. m.

Fatigue of Metals, Testing, Metallography

- Informal Report of Research Committee on Fatigue of Metals. H. F. Moore, chairman.
- Fatigue Testing in Tension of Galvanized Wire: Effect of Initial Tensile Stress. S. M. Shelton and W. H. Swanger, U. S. Bureau of Standards.
- The Fatigue Properties of Light Metals and Alloys. R. L. Templin, Aluminum Company of America.
- An "Overnight" Test for Determining Endurance Limit. H. F. Moore and H. B. Wishart, University of Illinois.
- Report of Committee E-1 on Methods of Testing. W. H. Fulweiler, chairman.
- Report of Committee E-4 on Metallography. C. H. Davis, chairman.

Thursday, June 29, 2 p. m.

Corrosion of Metals

- Report of Committee A-10 on Iron-Chromium, Iron-Chromium-Nickel and Related Alloys. Jerome Strauss, chairman.
- Report of Committee A-5 on Corrosion of Iron and Steel. J. H. Gibboney, chairman.
- Consistent Data Showing the Influence of Water Velocity and Time on the Cor-

rosion of Iron. R. F. Passano and F. R. Nagley, American Rolling Mill Co.

Report of Committee B-3 on Corrosion of Non-Ferrous Metals and Alloys. T. S. Fuller, chairman.

Corrosion Resistance of Structural Aluminum. E. H. Dix, Jr., Aluminum Company of America.

Report of Sectional Committee on Specifications for Zinc Coating of Iron and Steel. J. A. Capp, chairman.

Friday, June 30, 9:30 a. m.

Non-Ferrous Metals

- Report of Committee B-2 on Non-Ferrous Metals and Alloys. William Campbell, chairman.
- The Effect of the Addition of Lead on the Hardness of Certain Tin-Base Bearing Alloys at Elevated Temperatures. J. N. Kenyon, Columbia University.
- A Comparison of Certain White Metal Bearing Alloys Particularly at Elevated Temperatures. C. E. Swartz and A. J. Phillips, American Smelting & Refining Co.
- Report of Committee B-5 on Copper and Copper Alloys, Cast and Wrought. C. H. Mathewson, chairman.
- The Effect of Impurities, Iron and Sulphur, on the Physical Properties of Cast Red Brass (Cu 85, Sn 5, Zn 5, Pb 5). H. B. Gardner, Non-Ferrous Ingot Metal Institute, and C. M. Saenger, Jr., U. S. Bureau of Standards.
- Report of Committee B-4 on Electrical-Heating, Electrical-Resistance and Electric-Furnace Alloys. Dean Harvey, chairman.
- Report of Committee B-6 on Die-Cast Metals and Alloys. H. A. Anderson, chairman.

Metallization Discussed At Montreal A. S. S. T.

"Metallization" was the subject of the meeting on May 8 of the Montreal Chapter, A. S. S. T. The speaker was A. Van Winsen, a member of the chemistry staff of the National Research Laboratories in Ottawa. Mr. Van Winsen was in Zurich, Switzerland, at the time the Swiss engineer Schoop perfected his metal spraying gun. In 1914 he was commissioned by the Japanese Government to apply the process commercially in Japan, so, after some months in Schoop's laboratory when he became thoroughly conversant with the process, he spent three years in Japan.

As oxygen and acetylene were at that time difficult to obtain in parts of Japan, Van Winsen was asked to develop the use of electricity as a substitute. He did this, and the electric metal spraying gun proved eminently useful until the gases became more generally available.

This, however, was purely incidental in the speaker's address, which described first the development of the metal spraying process through three stages, and then gave examples of its present-day use. Schoop conceived the idea when he saw the lead bul-

lets at target practice flatten and form a continuous coating on a steel sheet. His first attempt at metal spraying involved a cumbersome stationary apparatus for melting the metal and compressed air for projecting it. The second type of apparatus used metal dust which was merely shot against the object like a sand-blast, and only certain soft metals could be used. Finally the present compact, pistol-like mechanism was evolved, using metal wire and oxygen, acetylene and compressed air through three small hoses.

In general, it can be stated that this process is not intended to displace other methods of coating with metals, but to supplement them. It permits metal coatings to be put on where other methods are unavailable. This gives a wide scope to the metal spraying process, which is gradually making for itself a substantial place in the metal industry.

Class I railroads on April 30 had 618,864 surplus freight cars in good repair and immediately available for service, according to the Car Service Division of the American Railway Association. This was a decrease of 32,102 cars compared with April 14, at which time there were 650,966 surplus freight cars.

"Before the New Deal, Uncle Sam Must Discard"

WE reproduce, on this and the pages following, comments from prominent industrialists in our field. These are based upon an editorial insert of the above title which appeared in *THE IRON AGE* of May 18, and which introduced an appeal by Henry A. Wise Wood for the amendment of the Sherman and other "restraint of trade" laws.

While the President's industry control measure contemplates the suspension of some of the provisions of these acts for the time being and in certain cases, there is no assurance that Congress will take the same enlightened view of the importance of this particular clause. As a matter of fact, a complete modification, rather than a temporary suspension is needed of these obsolete statutes designed for a past age.

Let the shackles be removed from prostrate industry before it is asked to arise and walk with even greater burdens to be carried on its shoulders.

THE subject treated of by Henry A. Wise Wood deserves, I think, the favorable consideration of everyone, whether or not directly engaged in industrial pursuits.

This country should be relieved from the hampering control of laws put on the statute books 30 or 40 years ago to correct conditions existing then, but which in the progress of time no longer exist.

In these modern times it should be possible to enact legislation which would regulate industry in a more useful way than by imposing conditions which mean self-extermination.

The outworn restrictive features of the Sherman and Clayton Acts should not be permitted to nullify the constructive features of the New Deal.

F. A. Merrick, President,
Westinghouse Electric & Mfg. Co.,
East Pittsburgh.

I CONGRATULATE you on your editorial "Before the New Deal, Uncle Sam Must Discard," in the issue of May 18, and commend it to the thoughtful consideration of all business men.

Business has been so long pursued and harassed by the painful impediment of anti-trust laws, that if reasonably administered and reasonably controlled relief were not in the offing, I fear we should witness very soon a withering spirit in the great business of the nation.

We may condemn the vileness of the few in our industry who through feeble-minded instinct and perverted

judgment have dealt in policies of ruinous price cutting, wage slashing and quality sacrifice, to the point of absolute corruption of all reason, but there must be some effective and drastic action that will absolutely assure an end to the source of these destructive policies. In any proposition or in any business there should be advantages that are shared among all and which cannot be lost by the will of a few. I regard the medium suggested by President Roosevelt as a proper, effective, and highly necessary weapon against the wielders of this destruction.

H. C. Thomas, Vice-president,
Alan Wood Steel Co., Conshohocken, Pa.

IT is my humble opinion that the continuity of our form of government depends substantially upon an adequate wage for our labor and a reasonable return for our capital.

Neither is possible under a law that fosters limitless cut-throat competition. The Clayton and Sherman Acts have served their purpose. They are, in their present form, a detriment to profitable industry. They should be amended.

W. A. Ready, President,
Ames Shovel & Tool Co., North Easton, Mass.

I HEARTILY endorse the idea of a modification of the "anti-trust" laws, as the time has come when all manufacturers must get together and

get a fair profit on the material that they manufacture.

In the manufacture of stoves, which we are now making a great many of, our labor is cut on these stoves to a certain extent. They must have a way to make a living if we are to shorten the hours of work per week. Taxes must be paid, and plants kept in repairs. If we furnish labor to these men they must have a place to work that is safe, and it takes a profit to do this. Manufacturers know, or ought to know, what a reasonable profit is. The Labor Commission appointed by the President, should be able to meet with them, and see that goods are sold at a fair profit, so that manufacturers can pay a fair wage.

C. E. Breaden, President,
Treaty Co., Greenville, Ohio.

I HAVE read your editorial in the current issue of *THE IRON AGE* relative to the modification of the anti-trust laws.

Uncontrolled competition is causing industrial suicide. This means loss of capital, unemployment, loss of earning and spending power by labor, discontent and misery with all their attendant evils.

The law should be amended to permit industry to operate at a fair profit which would mean conservation of capital, earning and spending power by labor, a happier, better people.

Uncontrolled competition must be replaced by controlled competition, otherwise catastrophe lies ahead.

G. H. Chisholm, President,
Atlas Steel Casting Co., Buffalo.

IT seems to me that our present anti-trust laws are about as modern and up-to-date as an automobile produced in 1900 would be if operating at the present time. It might still operate, but it would be so far outclassed by the modern car that for most people it would be entirely inadequate.

One of the best allies our foreign competitors have in taking business away from American concerns are these same anti-trust laws.

The cancellation, liberalizing or

modernizing our present anti-trust laws would, I believe, be a very potent factor in helping industry come back to a position where it will be able to operate on a sane basis and produce at least a living profit.

Lawrence M. Viles, President,
Buda Co., Harvey, Ill.

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WE have read with much interest your timely editorial on the "new deal" for industry as it affects production, wages, profits and prices.

Having had some experience with trade conference agreements formulated in cooperation with the Federal Trade Commission, we believe such agreements if entered into by a majority of the producers in an industry will prove the most satisfactory way for all concerned of dealing with the many problems presented in any "new deal" plan.

The agreements must, however, be enforceable by the Federal Trade Commission and apply to both interstate and intrastate commerce.

We believe the anti-trust laws should be modified to permit industry to obtain such a "new deal."

I. L. Jones, Treasurer,
International Heater Co., Utica, N. Y.

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IT was with a great deal of interest that I read Mr. Wood's "Before the New Deal Uncle Sam Must Discard." It occurs to me, however, that Uncle Sam, before discarding, should be sure that he had enough cards up his sleeve, can spring a cold deck, or have enough in the kitty to buy a new deck. As dealer he must be assured that he has ample resources to cover all bets, and have dealers who cannot be bluffed.

The individual organizations and units in industry, sad to relate, have been playing lone hands, bluffing with so-called scientific management, quantity production, high-powered salesmanship, inflated credit, and cut-throat competition with no ace in the hole other than their stockholders' so-called capital investments and surplus, which, in the past three or four years, has resulted in staggering losses and exhausted the resources of the kitty.

If they have had a change of heart and are willing to conceive that their past efforts as individuals have been disastrous and work together with their competitors, a whole lot can be accomplished with the help of our General Manager in Washington.

However, it is my opinion that the mere changing of our laws or the Sherman Act will not solve this question entirely. Many industries have and are now regulated, prices being fixed absolutely; for instance, Public Utilities, Railroads, Insurance Companies, Banks, and etc., and it is needless to comment that the majority of them have been or are in serious

trouble. In other words, we have all been fiddling while Rome burned. We must also be sure that our political friends do not insist on too much of a rake-off for the kitty in the way of increased overhead, as that will be disastrous.

The above may need some explaining to some of our friends who do not play the great American game of "Poker." I will leave this to the Editor.

H. E. Hughes, President,
Continental Bridge Co., Chicago.

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I HAVE read with keen appreciation and interest the editorial on the old "anti-trust laws." I have written my friend Senator Harry Byrd as per the following:

My dear Senator:

As a statesman as well as a *business man*, I feel very sure that you will agree with me that the old "Anti-Trust Laws" have long outlived their usefulness, if indeed they ever served a wise purpose. You will doubtless read the enclosed "advance editorial" from THE IRON AGE with interest. You know the Sherman Law was more or less a dead letter for nearly 10 years after its passage, and many manufacturers in order to survive their own bloody competition had understandings as to prices and production, which enabled the smaller manufacturers to survive. Later on there were some abuses of a minor nature, which furnished the ammunition for concrete prosecutions in the light of "interpretations" of the law, and many manufacturers were hauled into court as "malefactors" and heavily fined. I happened to be one of them for making horseshoes the price of which was never higher than 5c each to the blacksmith—a vast contrast from the hand-made shoes which took the blacksmith about a day to make a set, when I took the horse to the shop and kept the flies off the legs on the ground with a horse tail while my friend shod the horse. When the law was invoked, the big ones could stand the gaff better than the smaller ones, who finally surrendered. That's history.

I earnestly trust that you may be able to frame more just and workable laws and thus hasten the "new deal."

Faithfully yours,

Thos. S. Wheelwright, President,
Old Dominion Iron & Steel Works,
Richmond, Va.

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REFERRING to your editorial in the May 18 issue of IRON AGE, on "Before the New Deal Uncle Sam Must Discard," harmful "restraint of trade" laws should have been dropped years ago. What were originally intended to prevent monopolies and exorbitant price-fixing by trusts, degenerated into legalized attacks by the Government officials on legitimate efforts of manufacturers to secure reasonable stable prices for their products. Such security is absolutely necessary if the manufac-

turer is to pay reasonable wages to his workmen, and a return of some kind on the capital invested in his business. As Mr. Roosevelt so ably brought out in his last radio address, there is no room in modern business for the 10 per cent or less of unscrupulous manufacturers who ignore actual costs, based on decent living wages for men, choose to cut selling prices below costs. They have done far more harm to the country than the trusts ever did and every legitimate manufacturer welcomes the provisions in the new Industry Bill to prevent such ruinous price-cutting, by enforcement if reasonable codes of prices with provisions for reasonable hours of labor and workers' wages. I am of the opinion this new National Industry Recovery Bill offers the most constructive policy ever adopted by any government and one that will do far more than anything done before to bring back good standards of living for everybody.

Frank Hodson, President,
Empire Steel Castings, Inc., Reading, Pa.

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YOUR editorial in May 18 issue of THE IRON AGE is very timely. I heartily concur in what you have said. The Anti-Trust Laws are antiquated and need to be changed to suit present day conditions.

I hope that the present Administration and the present Congress will realize that this is necessary to help us in the return of better times.

J. H. Brillhart, President,
Fort Worth Structural Steel Co.,
Fort Worth, Tex.

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YOUR editorial, "Before the New Deal," is an excellent article. Let's amend the Sherman Act. We won't abuse the privileges.

C. T. Botsford, President,
Chillicothe Iron Co., Chillicothe, Mo.

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I QUITE agree with your editorial insofar as the Sherman Law is concerned but with the elimination of the Sherman Law, I am wondering whether you advocate Government regulation of industry as to selling prices and wages. I think you can appreciate that an artificially controlled price system unless it is coupled with good judgment and honesty will invite additional competition as in the control of prices there might be an excessive profit. Of course, I realize talking of excessive profits today in the steel industry sounds like undue optimism but unless some plan can be worked out whereby further capacity can be discouraged until such time as America catches up with present producing capacity, I believe your plan would be doomed to failure.

One of the most asinine things that has come to the writer's attention in recent months is the persistence on

the part of some steel executives to break into print with the assertion that at 35 per cent to 40 per cent of operations they can make a profit. The writer is wondering what their motive could be in statements of this kind. Undoubtedly the purchasers of our commodities, like myself, see these statements and of course predicate their actions based upon such statements. We assume, of course, that these gentlemen have good memories and when such wild statements are made they naturally react at some future time.

It would seem that the first thing which should be done by all executives in the steel industry is to exercise their God given right to help themselves and get together and be honest one with another as to prices and operating conditions generally as after all they are the ones who are responsible and determine the policy of the industry. You know and I know that it is within the power of a dozen men in the steel industry, if they will be honest with themselves and their fellowmen to correct the very large percentage of the ills which now afflict the industry.

I am not unmindful of the fact that there are too many executives who in reality are hired men and who are more concerned about their own particular position and not enough concerned about the rights of their stockholders. If these men were spending their own money and losing their own money or a greater percentage of it than they now are, they undoubtedly would correct the situation much quicker, and in conclusion while I believe the Sherman Law is antiquated, I am not quite sure that Government regulation will be the panacea but I do believe as I stated before that honesty, integrity and frankness together with truthfulness in our own group would go a great deal farther in correcting the situation.

W. H. Daney, President,
Canton Tin Plate Corp., Canton, Ohio.

I AM very favorable in principle to the purposes of the proposed Federal Industries Act for the reason that some method of avoiding cut-throat competition must be devised. The Anti-Trust Law must be modified, and we have got to recognize that Industry must be willing to accept some form of Government control.

Roy C. McKenna, President,
Vanadium-Alloys Steel Co., Pittsburgh.

YOUR editorial in THE IRON AGE of May 18, is before us. "Before the New Deal Uncle Sam Must Discard."

The recommendation of Henry A. Wise Wood and your comments are "Straight from the Shoulder." We need honest expressions of this character from you and from hundreds of

others who subscribe to these opinions.

Going a step further, we advocate a still more drastic law to replace the Sherman and Clayton Acts, that will make it obligatory upon the large metal working and steel manufacturing industries to establish price schedules (through trade association action, or otherwise). These schedules to be approved by Government authority. Violators of prices named in schedules, whether buyer or seller, to be subject to fine (in substantial percentage of sale total) and imprisonment.

This is revolutionary legislation but it's time to act to salvage what is left for stockholders.

A. M. Oppenheimer, President,
Apollo Steel Co., Apollo, Pa.

UNDER Senate Bill 1712, all Federal Anti-trust legislation will be repealed for a period of two years. This will take the shackles off industry during the period of economic recovery, but it would be well if Congress would review the Sherman and Clayton Acts in the light of changing conditions and Court decisions, and pass a Bill which would afford protection to the public and, at the same time, permit reasonable cooperation in industry.

John B. Berryman, President,
Crane Co., Chicago.

HAD conditions not improved, there is but little doubt that the steel industry in the United States would have been bankrupt in a comparatively short time. Your editorial in the May 18 issue of THE IRON AGE is admirable, expressing as it does, so clearly, the condition of the steel industry today and many of the conditions leading up to same.

We agree most heartily with the appeal of Henry A. Wise Wood. Both the Sherman and Clayton Acts should be revamped and all features detrimental to this most important industry eliminated.

C. B. Houck, President,
Harrisburg Pipe & Pipe Bending Co.,
Harrisburg, Pa.

A GREAT quantity of the present day over-capacity in the industrial production in the United States could have been eliminated by insisting that all industry, and particularly any proposed new industries, procure, what might be called, a Certificate of Necessity, and I am informed that this has long since been necessary in Germany and several other countries. Certainly, this provision has proved itself to be wise in connection with the railroads, and there is not the slightest reason why the Federal Trade Commission could not exercise the same healthy influence on industry as that accomplished by the Interstate Commerce Commission on the railroads. Except for the latter, we

would be building a new line to Chicago across Pennsylvania under the guidance of Mr. Loree of the Delaware & Hudson.

The trade associations can be most helpful if given proper elbow room in this new program, and I would include having each association go on record, as to the necessity of any new unit in their industry, before the Federal Trade Commission would issue any such certificate.

G. R. Hauks, President,
Taylor-Wharton Iron & Steel Co.,
High Bridge, N. J.

THE public must not be penalized by inefficiency in industry, and industry should not be penalized by inefficiency in Government. There is a middle ground upon which both Government and industry must stand, that ground is fair price to the consumer and fair profits to industry, when honestly and economically operated.

L. J. Black, Chairman,
Beaumont Iron Works Co., Beaumont, Tex.

I HAVE read with very great interest the editorial you have prepared for the current issue of THE IRON AGE relating to the modification of the anti-trust laws. I am glad that you are endeavoring to encourage an interest on the part of the steel industry, at this time, in legislation which contemplates a liberalization of the antiquated statutes "in restraint of trade." The present Congress has the opportunity by so doing to create more employment than through the outright gift of billions of dollars from the Federal treasury. I sincerely hope that you may find encouragement to continue this worthy effort.

J. L. Kimbrough, President,
Indiana Bridge Co., Muncie, Ind.

IT is a recognized fact that the return to normal prosperity hinges on being able to give the worker in factory and office a regular fairly well filled pay envelope. This the present administration is trying to do and with considerable success, considering its handicap of obsolete laws against acts "in restraint of trade." Time was when price fixing and monopoly in industry were practiced to a burdensome degree and demand exceeding supply fostered the growth. The Sherman and Clayton Acts curbed these practices but these acts have in themselves now become a burden in place of an aid and should be modified to permit industry to pay a living wage to the workers without forcing itself into bankruptcy.

Unwittingly, no doubt, the Government is at the present time one of the worst offenders, awarding contracts for supplies to the lowest bidder, regardless of prices quoted, and placing

orders with firms on the verge of bankruptcy that, to convert goods into cash, will accept less than the cost of the raw material, with no provision for labor or overhead. Government credit is only as good as the ability of its citizenry to pay taxes; therefore, in revamping present laws care should be taken to allow industry to employ labor at a decent wage and make a fair profit for itself. Ignoring this, increasing taxes on industries will bring only diminishing results.

H. E. Moore, President,
Lansing Co., Lansing, Mich.

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THERE is no question but what modern business has come to the condition of taxation without representation. The "new deal," as now proposed by President Roosevelt, certainly outlines a fair opportunity to allow business to be represented in the activities of the Government, however, under control such that, if properly regulated, will eliminate the tops and bottoms of our business cycles.

We have two outstanding examples today of our business crisis. Many concerns are operating short time with a loss to its labor and its community, while others are working double shifts and, under present economic or competitive conditions, are simply turning over dollars likewise with no return to themselves or their communities. There is no question but what some outstanding form of business control becomes necessary.

Our business men should recognize the importance of such a change and be willing to cooperate with the Government and assist in building up the resources of our country.

Ralph H. West, President,
West Steel Casting Co., Cleveland, Ohio

• • •

I QUITE agree with you that it is to the general interest of industry in the country at large that the "anti-trust" laws either be amended or repealed. There has been and still continues to be, apologies made for the present condition of the steel industry, placing the cause at the door of "anti-trust" laws. We feel certain that you will agree that these laws have had little or nothing to do in creating the present condition. There is nothing in connection with the laws nor their application that would suggest any manufacturer selling his product at a continuous loss.

The balance sheets of a very large percentage of the manufacturers of steel of the past two years is complete evidence that, not only one, but all, have failed to recognize that business cannot be successfully operated without maintaining a selling price that is at least equal to the cost of production.

The repeal of the "anti-trust" laws will not remedy this condition.

We feel it is about time that the

larger units of the industry assume some real leadership in the maintenance of a selling price comparable with the cost of production. If we can read the trend of the changing condition, the leaders of our industry will either have to assume some leadership along stabilized lines or it will be necessary for Government regulations that will be even more severe to industry than the "anti-trust" laws which have recently been indicted as the greatest handicap to business progress.

A. K. Andrews, President,
Newport Rolling Mill Co., Newport, Ky.

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UNDoubtedly it is to the best interest of, not only our industries but of the general public, to modify our antiquated anti-trust legislation, in order that we may be free to take such measures for self protection as experience shows to be necessary, subject only to such regulations as will assure the protection of both producer and consumer.

All legislation should provide for impartial treatment of every interest, agricultural, industrial, financial, educational and social, and be fair to both labor and capital, buyer and seller, producer and consumer.

It is a good time to discard all class legislation in the interest of all our citizens.

T. J. Gillespie, President,
Lockhart Iron & Steel Co., Pittsburgh.

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WE have read with care your editorial, which is very commendable.

In the opinion of many manufacturers today this is one of the procedures which will cure industry which is constantly absorbing its capital to maintain an existence, and furnish a livelihood for employees.

Frank B. Metcalf, President,
International Boiler Works, E. Stroudsburg, Pa.

• • •

I HAVE read your editorial on the anti-trust laws with interest and approval. I think the "Anti-Trust" law as it has been interpreted by the courts and enforced by the law officers of the Government has been most hurtful to industry, especially to small industrial companies.

Archer Anderson, Jr., President,
Tredegar Iron Works, Richmond, Va.

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I HAVE read your editorial in the May 18 issue of THE IRON AGE and heartily agree that these antiquated Sherman and Clayton Acts should be modified to give industry a fair chance. Certainly consumers of raw material or finished products can afford to pay a fair price which will return a fair profit to the various industries, assuring prosperity to all

concerned. The difference between profit and loss is such a small percentage and the benefits to be derived by assuring this profit to everyone are so great that I sincerely hope our President will succeed in putting through a practical program to assure these results, and we should all use what influence we have to help put this through.

Edgar E. Brosius, President,
Edgar E. Brosius, Inc., Pittsburgh.

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I HAVE read with much interest the editorial relating to the modification of the anti-trust laws.

I am of the opinion that the steel industry also needs a "New Deal," and I know of no better time to present the subject than at the present.

I hope that you will find it possible to continue such editorials, as I am certain that it is one of the best means of awakening the industry as a whole to action, and I am also of the opinion that it is going to take some pressure from the group to move our leaders.

R. W. Wolcott, President,
Lukens Steel Co., Coatesville, Pa.

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YOUR editorial appearing in THE IRON AGE of May 18 covers the ground so thoroughly that any further comments would be superfluous.

Industry, like Prometheus, is chained to a rock by the Sherman Act with destructive price cutters gnawing away its vitals. The divine fires of progress lit by the manufacturing industry will be certainly smothered if its restraints are not modified or removed.

F. J. Moore, President,
E. Keeler Co., Williamsport, Pa.

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I FIRST endorse the very good presentation of the facts in your editorial from THE IRON AGE of May 18, 1933, in reference to the workings of the Sherman Anti-Trust Law as related to the last three or four years. In cycles when the consumption runs ahead of production it is undoubtedly fitting that regulations such as contemplated by the Sherman Anti-Trust and other similar legislations should be operative, because there is some disposition for the manufacturer to exact from the consumer an exorbitant profit and this is undoubtedly a detriment to the welfare of the country as a whole. The opposite condition prevails at a time when production greatly exceeds consumption and the same protection should be accorded by new legislature so that the producer is enabled to maintain a price in keeping with his manufacturing cost and in keeping with the accepted scale of wages in the industry. In order to insure this

ton Acts than could possibly result from a moratorium modification or repeal of the said legislation.

The difficulty we experienced regarding the problem was how to discipline the recalcitrant individual who refuses to belong to any organization, and who believed that his success or money making ability could only be maintained by an orgy of self-destructive competition, with little or no regard as to cost, letting alone overhead or profit.

In 1890 the Sherman law and Clayton Act was, I believe, designed primarily to protect the public, but would now seem by 1933 these very acts are destroying the public and the small manufacturer, and that as you very fittingly put it, this legislation is now outmoded and decrepit.

W. Nelson Mayhew, President,
Montgomery Iron & Steel Co., Philadelphia

(Additional opinions from other leading members of the industry which were received too late to include in the foregoing will appear in a subsequent issue.)

Insulating Open-Hearth Furnaces

A PAPER, "The Insulation of Open-Hearth Furnaces," delivered at the spring meeting of the American Iron and Steel Institute, May 25, and reviewed in other pages, was discussed by W. M. Henry, special engineer, Newburgh Steel Works, American Steel & Wire Co., Cleveland, and by A. W. Smith, general superintendent, Campbell Works, Youngstown Sheet & Tube Co., Youngstown, Ohio.

Particular attention was called by Mr. Henry to the fact that his company has been the pioneer in insulating open-hearth furnaces. All furnaces in his plant are insulated. One of the early references to the work done at Newburgh was a paper before the institute in 1930.

To secure good results, said Mr. Henry, radiation losses of a furnace must be carefully determined in advance. It is best to so insulate furnaces as to maintain existing temperatures. In all cases increased life of furnaces has resulted. Mr. Henry presented a detailed statement of the distribution of radiation losses, indicating that 64 per cent takes place in the roof and end walls. Partial insulation is not conducive to good results. Insulation provides even distribution of heat in the entire system. The value of insulation depends on the cost of fuel at the plant but in all cases benefits accrue from its use.

Iron & Steel Products, Inc., Chicago, has purchased the detinning plant of the Vulcan Detinning Co., Streator, Ill.

Objectionable Features Disclosed in Industrial Control Bill

Failure to Regulate Foreign Competition, Tax Provisions and Union Dominance Bring Protests from Business Leaders

WASHINGTON, May 29.—While still maintaining adherence to its principles, many industrialists have turned strongly against certain features of the Industrial Control bill.

Passed last Friday in the House of Representatives by a vote of 324 to 76, vigorous efforts have been made at hearings before the Senate Committee on Finance to have objectionable provisions eliminated and to have inserted a provision to control foreign competition. Leading the move is the National Association of Manufacturers, which at a meeting after the measure passed the House, declared it is unworkable in its present form. A committee from this association, headed by Robert L. Lund, president of the association, cooperated with President Roosevelt and other Government officials in preparing the legislation. The committee now says that as drafted the measure would retard rather than aid recovery of business.

The committee insists that the dangerous features of the bill which would destroy its power to lift the country from the depression are the licensing provisions, the failure to regulate foreign competition, the employment clauses and the tax levies proposed. The tax levies are provided to take care of the public works section of the bill appropriating \$3,300,000,000.

The license feature authorizes the President to license business enterprises when he finds it necessary to make effective a trade practice code of fair competition. After a trade or industry has been subjected to a license, no one may engage in or carry on trade in interstate commerce without first obtaining a license. The licensing clauses are held by its opponents to be unconstitutional. It is contended that they are so drastic as to excite universal apprehension. They grant, according to the committee of the National Association of Manufacturers, "the power of commercial exile and complete confiscation of property."

Imports From Low-Wage Countries

It is also maintained by the committee that failure to provide for the destructive competition of imports from low labor cost countries, particularly those with the added advantage of debased currencies, may completely destroy the plan, which is to raise the level of wages. Advances in production and distribution costs

and prices, it was explained, necessarily will follow. The competitive advantage of foreign countries, it was urged, will thus be greatly increased and the United States will be flooded with merchandise displacing domestic products and causing wide-spread unemployment.

In its original form, the bill gave wide recognition to labor, much wider than some of the manufacturers who assisted in preparation of the legislation thought should be given. As it emerged from the House it was made even stronger from a point of labor demands, including those urged by President William Green of the American Federation of Labor and Donald R. Richberg, counsel for railroad unions. It was at the request of Mr. Green that the House Committee on Ways and Means inserted a provision that no one seeking employment shall be required to join any company union. This provision was tied in with the provision that no employee shall be required to refrain from joining a labor organization of his own choosing. Other labor provisions will make it necessary that, before codes of practice are approved by the President through his administrator of the law, it shall be agreed that employees shall have the right to organize and bargain collectively and that no employee shall be required as a condition of employment to sign an anti-union contract.

Company Unions Threatened

While the view has not been openly expressed by opponents of the labor provisions, some of them have argued that they are so stringent that industry could be much more extensively unionized if organized labor saw fit to make the effort, as some think it will. The company union, existing in steel and many other industries, might be seriously threatened if not made a thing of the past by the same token. For, it is urged, if organized labor wants to insist upon rights given it, as it is naturally assumed it will because it asked for their recognition in the bill, it can abolish company unions simply by not permitting members of organized labor to join them. This, of course, is predicated upon unionization of industry and while it is assumed it would not apply to all industries, or at least all units of industries, it is the conviction of many that unionization would become much more widely spread than it now is.

Under the provisions of the bill

organized labor could demand this power as conditional upon the approval of trade practice codes. The provision for the right of collective bargaining by employees through representatives of their own choosing obviously is given to labor because of its contention that many industries permit collective bargaining in theory only rather than in practice because, it is alleged, such industries select and have under their control the labor representatives. The provision that an employee shall not be required to sign an anti-union contract manifestly is directed against the so-called "yellow dog contract," which was especially prevalent in sections of the coal industry.

The committee of the National Association of Manufacturers declared that the employment provisions, as now drafted in the bill, "might easily destroy the welfare organizations now common in industry for sickness insurance, group life insurance and other such benefits. They might further serve to force employers to deal with racketeering organizations. This legislation has for its purpose industrial recovery; if it acts to create labor difficulties it will defeat itself. Management in industry has no wish to use this legislation to change existing satisfactory labor conditions and believes that their employees, in the vast majority, are of the same mind."

Tax Proposals Are Unfair

The committee also attacked the tax proposals of the House bill. They were branded as being unfair and unendurable. They involve, it was pointed out, a great increase in the rate on lower bracket and middle class incomes, with corresponding effect on their employing and consuming power. They increase by 75 per cent the Federal tax on gasoline, it was pointed out, and levy a double tax on "that rare thing"—dividends—discouraging investment when funds are already but 5 per cent of what they were in 1929.

"Unless we distribute our emergency burdens," the committee inquired, "how are they to be endured? A single point gross manufacturers' tax to provide for service charges for the public works program could exempt food products, clothing and medicine and secure necessary revenue. Even then it would have to be largely absorbed by industry."

The large vote by which the bill passed the House is greatly misleading as to its popularity. Once its passage was assured many Democrats who previously had revolted against its different phases joined the ranks of the party and voted for it. Indeed the gag rule under which the bill was jammed through the House first mustered a bare two-vote majority, 190 to 188, while a second vote was 213 to 194.

Opponents say that many industrialists, after giving the measure

closer study and realizing the power it gives the Government over business, are becoming either lukewarm toward it or are becoming openly hostile to it.

In the House the bill was also attacked by members of both parties because of the provisions suspending the anti-trust laws. The hottest debate, however, was over the tax features against which the country as a whole has reacted strongly. It is hoped that the bill will be greatly modified in its tax provisions and a lively drive will be made again for adoption of a general manufacturers' sales tax, narrowly voted down in the House when Representative McCormack of Massachusetts moved to substitute this form of taxation for that which the committee was able to

get through only after a hard struggle.

In the public works section the House committee incorporated a new provision that materials used on the projects shall be of domestic manufacture or production, if available at a reasonable cost. This provision was inserted upon the recommendation of J. Carl Adkerson, president of the American Manganese Producers' Association. Steel manufacturers have said this will not require the use of domestic manganese ore in making ferroalloys. They point to the fact that a provision similar to that suggested by Mr. Adkerson is carried in the Postoffice-Treasury appropriation act and does not bar the use of foreign manganese ore.

Council of 21 Industrialists Proposed by Sec'y Roper

WASHINGTON, May 29.—Tying in with industrial planning through government "partnership" with business under the Industry recovery legislation, Secretary of Commerce Daniel C. Roper is preparing to organize a group of prominent industrial councillors whose functions will be to advise the Department of Commerce as to the best means of stimulating and reviving business.

With this end in view, it is understood that Secretary Roper has arranged for a meeting soon with a group of industrialists at which plans will be made for setting up what Mr. Roper has said probably will be called the President's Council on Business. Tentatively, Mr. Roper has suggested that the council be made up of 21 prominent industrialists, representing a wide range of industries and the different sections of the country.

The Council will consist of men able to supply the government experienced advice on the multitude of plans for the stabilization of industry and for government aid in such connections. While detailed work of the Council has not been mapped out, it is reported that it might play a prominent part in cooperating with the agencies to be set up under the Industrial Recovery bill to pass upon trade practice codes. Mr. Roper has said that the proposed Council would serve as an agency through which there could be turned back to business its proper responsibility for effecting through its own organizations those measures which had received the approval of the government.

"I might also say that such an agency could greatly relieve the existing pressure upon the government by

itself undertaking to analyze and work out, in cooperation with the proposed business agencies and with the assistance of government experts, propositions not requiring governmental guidance or legislative action," Secretary Roper recently stated in announcing his plan.

It is thought that at the preliminary meeting Mr. Roper will receive suggestions not only as to the central plan itself but also as to the ways and means of putting it into concrete operation. One problem obviously is that of choosing the members of the committee representing trade and industry. He has suggested that possibly it might be desirable to bring into the picture the departments of economics and schools of business administration of some of the great universities. This, however, will apparently be left to business men, with the government offering counsel.

Eastern States Blast Furnace and Coke Oven Association announces that the annual spring meeting and election of officers will be held at the Edgewood Country Club, Pittsburgh, Friday, June 9.

A joint round-table discussion, with A. M. Kennedy as chairman, will consider the following subjects:

1. Top Gas Analysis in terms of coke consumption.
2. Magnesia in Slag and its relationship to the other components.
3. Effects of minus 48 mesh coal on quality of coke produced in By-Product Ovens.
4. Coal Veins and their characteristics in Western Pennsylvania.

Trade Associations Must Broaden Functions, Says Abbott

TRADE associations, must be equipped to undertake a broader scope of sociological functions. They must look beyond the internal problems of the industry they represent, and cooperate with their Government in making this a happier world in which to live, according to Charles F. Abbott, Executive Director of the American Institute of Steel Construction, who addressed the conference of statisticians in industry called by the National Industrial Conference Board, May 16. Increases in wages and employment cannot be achieved, he contended, unless the industrial sniper, who creates the sweatshop, is restrained. Organized industry is willing to submit to a measure of governmental regulation in order to obtain the power needed to end that cut-throat competition.

"Many of us," said Mr. Abbott, "have despaired of effecting any remedy under the anti-trust laws. But nobody will criticize us for hoping that from our present distress will evolve a better government. It would indeed be unlike history did we not profit from it. Our quarrel has been

not so much with existing statutes as with the attitude of mind of those charged with interpreting and enforcing those statutes.

"If President Roosevelt's industrial program will enable the trade associations to clean the sweatshop out of industry it will be the most constructive move that has been made in a century.

"Those industrial snipers have paid starvation wages in order to cut prices on the honest producer. They have torn down the wage scale, stripped the profits by indulging in cut-throat competition and their very existence is a menace to public welfare. They should not be permitted to indulge in practices that are opposed to public interest.

"In the future, an industry must rely upon its trade association. It cannot survive without a well planned trade organization. But it will be a different kind of an association. The program will include plans to protect labor, to promote public welfare, as well as to insure profitable operation of our business enterprises."

April Production of Autos, Barrels, Boilers

WASHINGTON, May 29.—The production of motor vehicles in April increased to 181,029 units from 118,609 in March, according to reports received from manufacturers by the Bureau of the Census. The April output consisted of 153,330 passenger cars, 27,308 trucks and 391 taxicabs. The increases in passenger cars and trucks in April over March were 53,445 and 9244 respectively.

In the first third of this year production of motor vehicles rose to 536,507 from 504,047 in the corresponding period of 1932. The output in the first four months of 1933 consisted of 452,876 passenger cars, 82,423 trucks and 1208 taxicabs, comparing with 413,022 passenger cars, 90,798 trucks and 227 taxicabs in the first four months of last year.

Canadian motor vehicle production in April was 8255 against 6632 in March.

The output of steel barrels in April rose to 401,086 units from 373,340 in March, according to reports received by the Bureau of the Census from 26 establishments. In the first four months of the current year production totaled 1,336,382, compared with 1,626,830 in the corresponding period of last year. Unfilled orders at the end of April for delivery within 30 days totaled 112,979 barrels against

94,424 at the end of March. Unfilled orders for delivery beyond 30 days totaled 413,512 and 416,313 respectively.

Orders were placed in April for 235 steel boilers aggregating 225,124 sq. ft., compared with 193 having 244,551 sq. ft., according to reports received by the Bureau of the Census from 70 manufacturers.

April Malleable Output Sharply Up

WASHINGTON, May 29.—Orders for malleable castings in April increased to 17,856 net tons from 12,380 tons in March, 112 establishments reported to the Bureau of the Census. Production rose sharply to 17,871 tons from 9756 tons, representing 21 per cent of capacity, compared with 11.2 per cent of capacity.

Scrap Has Firm Tone at Detroit

DETROIT, May 29.—The local scrap market was moderately active the past week. Prices are relatively strong at levels established a week ago. The local steel plant is taking in sizable tonnages on current contracts, while a Detroit furnace interest has bought some blast furnace scrap. The fact that dealers feel that the price trend may again turn up-

ward in the near future is giving the market an undercurrent of strength. Less scrap is coming out of the automobile industry than one might suppose in view of the present good production rate. This is attributed to reduction of wastage in manufacture accomplished by better production methods and to the increased practice on the part of motor car companies of having raw parts blanked at the steel mills prior to shipment.

Great Lakes Steel Awards Construction Contracts

Great Lakes Steel Corp., Detroit division of National Steel Corp., has awarded to the Whitehead & Kales Co., River Rouge, Mich., a contract for the construction of additions to its open-hearth, soaking pit and gas producer buildings.

This confirms recent reports that Great Lakes has decided to erect new open-hearth furnaces to bring its ingot-making capacity more nearly to a level with its finishing capacity in bars, hot strip and sheet steel. Although no official announcement has been made, it is assumed that two new open-hearths will be added to the present battery of six 150-ton furnaces. The soaking pit capacity likewise will be enlarged. Great Lakes officials refuse to comment on the rumor that a mill to roll rim stock is part of the expansion program.

International Combustion Being Reorganized

International Combustion Engineering Corp., 200 Madison Avenue, New York, manufacturer of power plant equipment, in receivership since December, 1929, and recently acquired by a creditors' committee, headed by E. W. Stetson, chairman, for \$2,000,000, is arranging for reorganization. A new corporation is being chartered to take over properties, including Combustion Engineering Corp., with plants at Chicago, East Chicago, St. Louis and other points, manufacturer of grates, stokers, etc.; Heine Boiler Co., St. Louis, manufacturer of watertube boilers; and Hedges-Walsh-Weidner Co., Chattanooga, Tenn., manufacturer of boilers, tanks, etc. Plants will be continued at present locations and improvements will be made.

Babbitt Metal Up In April

WASHINGTON, May 29.—The production of Babbitt metal in April totaled 1,544,045 lb., compared with 1,134,928 lb. in March, according to reports received by the Bureau of the Census from 40 manufacturers.

Aging of Mild Steel Sheets

THE paper, "Aging of Mild Steel Sheets," delivered before the American Iron and Steel Institute, May 25, and abstracted in other pages was discussed by Dr. John Johnston, director, United States Steel Corp. Research Laboratory, Kearney, N. J., and by Dr. Albert Sauveur, professor of metallurgy, Harvard University, Cambridge, Mass.

Manufacturers, who have to deal with deep drawing of mild sheets, fully realize the importance of preventing stretcher strains, said Dr. Sauveur. They know also that their occurrence is closely related to the presence of a sharp yield point in the tensile of the steel sheet. Cold working is a means of preventing the occurrence of a yield point and, therefore, of stretcher strains. Unfortunately, aging after cold working restores the yield point and, consequently, the stretcher strains—facts clearly brought out by the authors.

Results obtained in the metallurgical laboratories of Harvard were then presented by Dr. Sauveur, in which, as a means of cold working, Brinell hardness tests under different pressures varying between 500 and 5000 kg. were used.

It is held by many, according to Dr. Sauveur, that the increased hardness resulting from aging after cold working is due to the precipitation of a solute or solutes dissolved in ferrite. It is generally believed that the precipitation of FeO , Fe_3C or some nitride may be separately or jointly responsible for the aging phenomenon. It is reasonable to assume that precipitation may take place: (1) during the cold working operation itself and (2) after that operation, from which it follows that absence of aging after cold working is no indication that precipitation has not taken place. We believe it to be an indication that the urge to age has been so great that precipitation took place during the cold working operation. This readily explains the observation of the authors that a slight amount of cold work deformation is generally followed by more marked aging than is the case after a more severe deformation.

It would seem that, since it is the precipitation taking place after cold work deformation which causes the return of the yield point and the occurrence of stretcher strain, the obvious cure should be to cold work the steel sheet so severely that precipitation will take place for the most part at least during the cold working. Unfortunately, so great an amount of cold work reduction results in an objectionable loss of ductility. A cure, if any, must therefore be sought elsewhere.

Some opinions from the authors as

to the cause of aging would have been acceptable, said Dr. Johnston. Is it due to precipitation hardening? If so, what is it that precipitates? Is it because some heats are more sensitive than others or that the condition of the liquid steel in the heat or the condition while freezing have some influence? Many investigators are still uncertain as to how to interpret these phenomena which seem to be dependent on obscure factors. It seems to be a question of a variation of constituents in very small amounts, present in thousandths of a per cent. The problem is a difficult one.

Steel Companies Buy Mill Equipment

PITTSBURGH, May 29.—Sales of machine tools and machinery have been heavier in the last month, although most orders have called for single tools and repair parts. Inquiries are much more numerous but are slow to be closed, many of them appearing principally for the sake of estimating the cost of proposed improvement programs.

Builders of rolling mill equipment and machinery have booked a number of orders, chiefly for sheet and tin mill equipment. Five stands of cold rolls will be required for the tin mill installation of the Inland Steel Co., Chicago, the order having gone to the Mesta Machine Co., West Homestead, Pa. Tin house equipment went to the

Aetna-Standard Engineering Co., Youngstown. Orders for feeder and catcher equipment for sheet mills are still coming in and the growing importance of cold-reduced tin plate will likely lead to the placing of many mills in the near future. Most recent orders were placed by the American Sheet & Tin Plate Co., for Gary, Ind., the Jones & Laughlin Steel Corp. for Aliquippa, Pa., and the Republic Steel Corp. for Warren, Ohio.

A steel producer in the Middle West is considering the addition of two open-hearth furnaces and is inquiring for the equipment required.

Bliss Co. to Move To Toledo

E. W. Bliss Co. announces the completion of its plans to consolidate its manufacturing, engineering and principal sales office with those of its subsidiary, Toledo Machine & Tool Co., at Toledo, Ohio, which will result in substantial economies and increased efficiency, thereby putting the company in an improved position to take care of the needs of its customers.

The entire line of Bliss presses, can machinery and special machinery formerly built at the Brooklyn plant will be manufactured at Toledo.

A sales office and complete repair shop will be maintained at the present Brooklyn address, Fifty-third Street and First Avenue, Brooklyn, N. Y.

Last Minute Sales Leads

(Received too late for classification in our plant Expansion Section)

State Industrial Commission, Capitol Building, Bismarck, N. D., asks bids until June 12 for equipment for new electric light and power plant at local State penitentiary, including boilers, stokers, steam turbines, generators, cooling tower and complete accessories. Fund of \$250,000 recently approved for plant. Pillsbury Engineering Co., Minneapolis, is consulting engineer.

Oconto Brewing Co., Oconto, Wis., has plans for extensions and improvements, including two new one-story units, and one story power house. Cost over \$100,000 with equipment. W. C. Weeks, Inc., 720 Ontario Avenue, Sheboygan, Wis., is architect.

Standard Oil Co. of Indiana, 910 South Michigan Avenue, Chicago, plans rebuilding of part of oil refinery at Whiting, Ind., recently destroyed by fire. Bulk of loss was in gasoline refining division, estimated over \$600,000 with machinery, tanks, etc.

Harrisburg School District, 121-23 Chestnut Street, Harrisburg, Pa., R. E. Boswell, secretary, asks bids until June 9 for supplies for machine shops, metal-working shops, automobile shops, electrical shops, wood-working shops and other vocational training departments at senior and junior high schools.

Arkansas Construction Commission, Capitol Building, Little Rock, Ark., asks bids until June 8 for waterworks equipment at institution near Benton, Ark., including boilers, pipe lines, pumping machinery and accessories. Cost about \$75,000. Mann, Wanger & King, Donaghey Building, Little Rock, are architects.

Imperial Brewing Co., 3016 Vernon Avenue, Los Angeles, Edward W. Moormeister, head, recently organized, has engaged W. Harry Hillier, architect, same address, to draw plans for new brewery at Imperial, Cal. Cost over \$125,000 with equipment.

Quartermaster, Fort McPherson, Atlanta, Ga., asks bids until June 15 for gas-fired boilers (Circulars 11, 12 and 13).

Harvey Coal Co., Harveyton, Ky., plans rebuilding electric power station at local mining properties, recently damaged by fire. Loss about \$70,000 with equipment.

August Wagner & Sons Brewing Co., 605 South Front Street, Columbus, Ohio, has plans for new multi-story addition, including improvements in present plant. Cost over \$400,000 with equipment. George Lehle, 111 West Washington Street, Chicago, is architect. Company will also make extensions and improvements in branch brewery at Chillicothe, Ohio, costing over \$75,000 with machinery. Bassett & Tresselt, 257 East Broad Street, Columbus, are architects for last noted project.

Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until June 6 for 36 motor-driven drill presses (Circular 663), three motor-driven milling machines (Circular 665), 220 rectangular portable tanks (Circular 670); until June 7 five electric trucks (Circular 660), four motor-driven power hack saws (Circular 682), two motor-driven squaring shears (Circular 662), three internal grinders, three grinder and buffer combinations, and two buffer and polisher combinations (Circular 658).

SUMMARY OF THE WEEK'S BUSINESS

Demand Continues to Gather Momentum As Steel Output Rises to 41 Per Cent

Tin Plate Production Reaches 90 Per Cent of Capacity With Full Operations in Sight—Further Steel Price Advances Expected as Industrial Bill Sequel

FURTHER gains in production and demand, coupled with growing strength in prices, are rapidly establishing the iron and steel industry on the firm footing of a sellers' market. Steel ingot output, which has had an uninterrupted rise since the third week in March, now averages 41 per cent of capacity as compared with 38 per cent a week ago. And expected seasonal influences have not yet come into play to check the forward movement.

The remarkable upswing in tin plate demand has brought output of that product up to 90 per cent of capacity, with full operations likely to be attained within a week. Continued expansion of specifications indicates sustained production for at least two months.

Automotive support of the steel industry is undiminished. Retail sales of motor cars, which for long had been concentrated in the Northeastern section of the country, particularly New York and the New England States, are now broadening out in the South and other regions.

MISCELLANEOUS steel consumers continue to increase their purchases. Electrical sheets are more active and tack plate is moving in good volume. Stamping plants are busier, especially those making kitchenware; electrical refrigerator makers are taking a heavy tonnage of sheets; and oil supply interests are buying steel for development work in the Southwest. Makers of conductor pipe and eave-trough are manufacturing on a larger scale to build up their stocks. Plate fabricators are booking tank orders from both the oil industry and brewers. A Detroit manufacturer has a backlog of more than 100,000 insulated steel beer barrels and is using 150 to 500 tons of sheet steel a week.

Railroad buying continues to lag so far as orders for rails and rolling stock are concerned, but growing interest is being shown in steel for equipment repairs. The Pennsylvania's release of 12,460 tons of rails to the Steel Corporation is being rolled at the Pittsburgh district mill, which resumed operations late last week. A Chicago independent is rolling 3250 tons for the same line. The New York Central will soon place about 8000 tons, and the Norfolk & Western is inquiring for 10,000 tons, as well as for 6000 kegs of spikes and a tonnage of tie plates.

Federal construction and road work requiring both structural steel and reinforcing bars is in the offing, but current lettings are light. Fabricated structural steel awards, totaling 11,800 tons, compare with 15,500 tons last week and 3750 tons two weeks ago. New

projects of 20,350 tons include 15,000 tons for a New York Central viaduct and 2200 tons for a brewery stock house in New York City.

DESPITE the relatively small tonnage now coming from the railroads, the construction industry and the oil companies—all three leading consumers of steel in normal times—May steel bookings were the heaviest for any month in nearly two years for many companies. Demand for sheets and strip steel has been stimulated by the recent advances for third quarter. However, not all companies participated in the advance and at least one that did has withdrawn its quotations. Apparently these producers are disposed to defer action on flat-rolled steel, as well as other finished products, pending definite information on wage rates during that period.

The manner in which the American Iron and Steel Institute reacted to the industrial recovery bill makes it possible that the first move of the industry to carry out its part of the program will be a general advance in wages. A 10 per cent increase in coal miners' wages in conjunction with price stabilization negotiations in the coal industry is considered significant.

Notwithstanding their unqualified support of the principles of the industrial control bill, iron and steel producers, as well as consuming interests, are commencing to voice their dissatisfaction with certain provisions and omissions in the measure, as passed by the House of Representatives.

Absence of machinery to regulate foreign competition is regarded as incompatible with increases in domestic wages and costs. The licensing feature, besides being of doubtful constitutionality, is so drastic as to excite universal apprehension. The employment clauses, it is feared, would invite labor trouble instead of promoting harmony in employer-employee relations, while the tax proposals would impose too heavy a burden on lower bracket incomes and discourage investment.

THE only important price advance on finished material to be announced this week was an increase in bolts, effective immediately. Pig iron continues to show strength, with the recent advances in the Valleys established in sales. THE IRON AGE pig iron composite has risen from \$14.56 a week ago to \$15.01 a gross ton. Scrap markets continue to show no definite trend, although a corrective movement in the East has raised THE IRON AGE composite slightly from \$9.67 to \$9.75. The finished steel composite is unchanged at 1.892c. a lb.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	May 29, 1933	May 23, 1933	May 2, 1933	May 31, 1932
<i>Per Gross Ton:</i>				
No. 2 fdy., Philadelphia.....	\$16.34	\$16.34	\$14.34	\$14.84
No. 2, Valley furnace.....	15.50	14.50	14.50	14.50
No. 2 Southern, Cin'tl.....	16.51	15.82	15.82	13.82
No. 2, Birmingham.....	12.00	12.00	12.00	11.00
No. 2 foundry, Chicago*.....	16.00	16.00	15.50	16.00
Basic, del'd eastern Pa.....	16.09	16.09	14.09	16.00
Basic, Valley furnace.....	15.00	14.00	14.00	14.00
Valley Bessemer, del'd P'gh.	17.89	16.89	16.89	16.89
Malleable, Chicago*.....	16.00	16.00	15.50	16.00
Malleable, Valley.....	15.50	14.50	14.50	15.00
L. S. charcoal, Chicago.....	23.17	23.17	23.17	23.17
Ferromanganese, seab'd car- lots.....	68.00	68.00	68.00	75.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel

	May 29, 1933	May 23, 1933	May 2, 1933	May 31, 1932
<i>Per Lb. to Large Buyers</i>				
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.10	2.10	2.00	2.20
Hot-rolled annealed sheets, No. 24, Chicago dist. mill..	2.20	2.20	2.10	2.30
Sheets, galv., No. 24, P'gh....	2.70	2.70	2.70	2.85
Sheets, galv., No. 24, Chicago dist. mill.....	2.80	2.80	2.80	2.95
Hot-rolled sheets, No. 10, P'gh	1.50	1.50	1.40	1.55
Hot-rolled sheets No. 10, Chi- cago dist. mill.....	1.60	1.60	1.50	1.65
Wire nails, Pittsburgh.....	1.85	1.85	1.85	1.95
Wire nails, Chicago dist. mill	1.90	1.90	1.90	2.00
Plain wire, Pittsburgh.....	2.10	2.10	2.10	2.20
Plain wire, Chicago dist. mill	2.15	2.15	2.15	2.25
Barbed wire, galv., P'gh....	2.35	2.35	2.35	2.60
Barbed wire, galv., Chicago dist. mill.....	2.40	2.40	2.40	2.65
Tin plate, 100 lb. box, P'gh..	\$4.25	\$4.25	\$4.25	\$4.75

Rails, Billets, etc.

<i>Per Gross Ton:</i>				
Rails, heavy, at mill.....	\$40.00	\$40.00	\$40.00	\$43.00
Light rails at mill.....	30.00	30.00	30.00	32.00
Rerolling billets, Pittsburgh..	26.00	26.00	26.00	27.00
Sheet bars, Pittsburgh.....	26.00	26.00	26.00	26.00
Slabs, Pittsburgh.....	26.00	26.00	26.00	27.00
Forging billets, Pittsburgh..	31.00	31.00	31.00	33.00
Wire rods, Pittsburgh.....	35.00	35.00	35.00	37.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb...	1.60	1.60	1.60	1.60

Old Material

<i>Per Gross Ton:</i>				
Heavy melting steel, P'gh....	\$11.50	\$11.50	\$11.75	\$9.50
Heavy melting steel, Phil...	9.25	9.00	8.25	6.25
Heavy melting steel, Ch'go...	8.50	8.50	8.25	6.25
Carwheels, Chicago.....	9.50	9.50	8.50	6.25
Carwheels, Philadelphia.....	9.75	9.75	9.75	9.00
No. 1 cast, Pittsburgh.....	10.50	10.50	10.00	9.00
No. 1 cast, Philadelphia.....	10.25	10.25	10.25	8.00
No. 1 cast, Ch'go, (net ton)...	8.75	8.75	8.00	6.50
No. 1 RR. wrot., Phila.....	10.75	10.75	10.75	8.50
No. 1 RR. wrot., Ch'go, (net)	6.50	6.50	6.00	3.75

Finished Steel

<i>Per Lb. to Large Buyers: Cents</i>				
Bars, Pittsburgh.....	1.60	1.60	1.60	1.60
Bars, Chicago.....	1.70	1.70	1.70	1.70
Bars, Cleveland.....	1.65	1.65	1.65	1.65
Bars, New York.....	1.95	1.95	1.95	1.95
Tank plates, Pittsburgh.....	1.50	1.50	1.50	1.60
Tank plates, Chicago.....	1.70	1.70	1.70	1.70
Tank plates, New York.....	1.598	1.598	1.598	1.898
Structural shapes, Pittsburgh	1.60	1.60	1.60	1.60
Structural shapes, Chicago...	1.70	1.70	1.70	1.70
Structural shapes, New York...	1.86775	1.86775	1.86775	1.86775
Cold-finished bars, Pittsburgh	1.70	1.70	1.70	1.70
Hot-rolled strips, Pittsburgh.	1.55	1.55	1.45	1.40
Cold-rolled strips, Pittsburgh	2.00	2.00	1.80	2.00

Coke, Connellsville

<i>Per Net Ton at Works:</i>				
Furnace coke, prompt.....	\$1.75	\$1.75	\$1.75	\$2.00
Foundry coke, prompt.....	2.50	2.50	2.50	3.00

Metals

<i>Per Lb. to Large Buyers: Cents</i>				
Electrolytic copper, refinery	7.25	6.75	6.25	5.12½
Lake copper, New York...	7.50	7.00	6.50	5.50
Tin (Straits), New York...	39.25	36.00	32.50	20.50
Zinc, East St. Louis.....	4.20	3.77½	3.75	2.87½
Zinc, New York.....	4.57	4.14½	4.12	3.24½
Lead, St. Louis.....	3.75	3.52½	3.37½	2.90
Lead, New York.....	3.90	3.65	3.50	3.00
Antimony (Asiatic), N. Y....	6.25	6.25	6.25	5.12½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

▲▲▲ The Iron Age Composite Prices ▲▲▲

Finished Steel

May 29, 1933	1.892c. a Lb.
One week ago	1.892c.
One month ago	1.867c.
One year ago	1.970c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot rolled strip. These products make 85 per cent of the United States output.

	HIGH	LOW
1933.....	1.948c., Jan. 3;	1.867c., Apr. 18
1932.....	1.977c., Oct. 4;	1.926c., Feb. 2
1931.....	2.037c., Jan. 13;	1.945c., Dec. 25
1930.....	2.273c., Jan. 7;	2.018c., Dec. 9
1929.....	2.317c., April 2;	2.273c., Oct. 29
1928.....	2.286c., Dec. 11;	2.217c., July 17
1927.....	2.402c., Jan. 4;	2.212c., Nov. 1

Pig Iron

\$15.01 a Gross Ton
14.56
14.10
14.06

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	HIGH	LOW
\$15.01, May 29;	\$13.56, Jan. 3	
14.81, Jan. 5;	13.56, Dec. 6	
15.90, Jan. 6;	14.79, Dec. 15	
18.21, Jan. 7;	15.90, Dec. 16	
18.71, May 14;	18.21, Dec. 17	
18.59, Nov. 27;	17.04, July 24	
19.71, Jan. 4;	17.54, Nov. 1	

Steel Scrap

\$9.75 a Gross Ton
9.67
9.42
7.33

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	HIGH	LOW
\$9.83, May 9;	\$6.75, Jan. 3	
8.50, Jan. 12;	6.42, July 5	
11.33, Jan. 6;	8.50, Dec. 29	
15.00, Feb. 18;	11.25, Dec. 9	
17.58, Jan. 29;	14.08, Dec. 3	
16.50, Dec. 31;	13.08, July 2	
15.25, Jan. 11;	13.08, Nov. 22	

Further Gain in Steel Demand at Pittsburgh

Ingot Output Up to 28 Per Cent—Tin Plate Production Reaches 90 Per Cent—Bolts Are Advanced

PITTSBURGH, May 29.—Further improvement in orders for finished steel products in this district has made May the best month in nearly two years for many companies. Momentum gained on May precludes any sharp contraction during June on sheets, strip steel, bars and tin plate, and the prospect of higher prices for third quarter is almost certain to bring in specifications for rolling and shipment during the first half of July.

No falling off in automotive tonnage is reported and railroad orders are more numerous. The Norfolk & Western is inquiring for 10,000 tons of rails, 6000 kegs of spikes and a tonnage of tie plates. Steel for railroad car repairs is in better demand and a local car builder has booked sizable orders for side frames in the last month. Fabricated structural steel awards are still limited, but new inquiry is appearing in better volume. The same might be said for reinforcing bars, and the Federal road building program for the year, which is now being readied, promises heavy tonnages of concrete bars and wire mesh in the fall.

Resumption of production by the local rail mill late last week has boosted steel ingot production in the Pittsburgh district to 28 per cent. The leading independent is also running better, and smaller mills are holding their own. Two steel works blast furnaces have gone in and another is expected to resume shortly. In the Valleys and nearby northern Ohio mills, production has reached 45 per cent while the Wheeling district is unchanged at 80 per cent.

Tin mill schedules have risen to almost 90 per cent of capacity, with all the available plants of the leading interest now active. Sheet production is approaching 40 per cent, with strip output almost as high. Bar mills are running at about 30 per cent and pipe units have been a little more active.

No important price advances have come out in the last week except a rise in bolt prices, effective immediately. Announcement of third quarter prices on the heavy hot-rolled products is being deferred, pending definite information on wage rates during the period. For the same reason the leading sheet producer is not booking sheet tonnage for third quarter at the recently announced increases. A 10 per cent increase in coal miners' wages is considered significant in view of price stabilization negotiations now under way in that industry.

Pig iron prices are stronger and recently advanced quotations have been established by sales. Scrap continues quiet with prices weak.

Pig Iron

Sales of small lots of foundry, malleable and Bessemer iron at the recently advanced prices have given the market a firm tone. The foundry and malleable grades are now quotable at \$15.50, Valley furnace, with Bessemer at \$16. Pittsburgh district furnace prices, 50c. higher than the above, have also been established. While no sales of basic iron have been reported, this grade is not believed to be available at less than \$15, Valley, and \$15.50, Pittsburgh district furnace. Shipments of all grades of iron are still increasing as foundry operations in the district improve. Orders for ingot molds have been gradually expanding, and the Hubbard, Ohio, blast furnace has been blown in to supply a nearby mold plant. This makes the third merchant stack to become active in the last month. Two steel works stacks have been lighted in the Pittsburgh district, and a third in the Valleys.

Semi-Finished Steel

Mills have not opened their books for third quarter, but an advance in the \$26, Pittsburgh or Youngstown, price for billets, slabs and sheet bars is generally expected. Shipments are heavier, particularly on sheet bars going to tin mills. Forging billets are strong at \$31, and wire rods are being taken in better volume by the bolt makers.

Rails and Track Accessories

With the decision to roll the Steel Corporation's entire share, amounting to 12,460 tons, of the recent Pennsylvania rail release at the Braddock, Pa., mill, the unit is assured at least another full week's operation. Release of track accessories are heavier, and the month's tonnage has shown a moderate gain over April. Further purchases by the carriers are expected during the summer, but no definite inquiries are now before the trade.

Bars, Plates and Shapes

Movement of heavy hot-rolled products shows scarcely any change, although a tendency toward expansion in demand is reported by some makers. Structural steel inquiry is a little heavier, and early release on a number of jobs which have been awaiting Federal funds is promised. Fabricating shops in the district are not active, although the general average is im-

proved by concentration of the work of one large company in this district. Rolling of steel for the San Francisco-Oakland bridge will likely begin early in the second half, although the tonnage will be distributed over a long period.

Reinforcing bars are in better demand, although it will be two or three months before the effects of the Federal road-building program are felt. Merchant bars continue fairly active, with orders coming from widely diversified sources. Alloy steel bars are moving principally to the automotive industry. Plates are rather quiet, although railroad car repair work is increasing, and one plant in the district has booked a small order for mine cars.

Third quarter prices have not yet been announced, but an advance over the current 1.60c. quotation on bars, plates and shapes is rather generally expected. Plate prices still reflect weakness in the Eastern district, but are at least \$2 stronger than they were a month ago.

Tubular Goods

Accumulation of small orders for seamless pipe brought two district mills into production for short runs last week. However, movement to the oil country is still sharply reduced, and butt-weld material is making the relatively best showing in the trade. Line pipe activity is still lacking.

Wire Products

Specifications for both merchant and manufacturers' wire are a little heavier, but no sharp improvement can be expected until late in June when consumers will be required to take out material against contracts. With quarterly commitments no longer being made, a price advance could be made effective very quickly. Jobber stocks of merchant wire products are still light, and difficulties of financing are preventing many of them from increasing their inventories.

Strip Steel

Higher prices on hot and cold-rolled strip steel have been tested on a little new tonnage booked during the last week. While the 1.60c., Pittsburgh, quotation on hot-rolled strip, and the 2c. price on cold-rolled are already effective on new orders, they are being extended through the third quarter. Meanwhile shipments against low-priced contracts are going ahead, and specifications will probably increase during June because of the expiration of these commitments. Demand from the automotive industry shows no abatement, and there is a fair movement of small lots to other manufacturing industries. Hoop stock continues fairly active, although the tonnage involved is not large.

Bolts, Nuts and Rivets

Leading producers of bolts have reduced discounts from 75 to 73 per cent off list, effective immediately.

The increased price is not applicable to third quarter business, for which manufacturers have not opened their books. Rivet prices are unchanged. Demand has been expanding gradually for several weeks, and the industry is engaged at about 25 per cent of capacity. Inquiry from the railroads showed notable improvement in the last fortnight.

Sheets

Demand has shown no signs of abatement and was heavier last week with some companies. A large part of current tonnage is going to the automotive industry, but other manufacturing consumers are increasing their requirements. Electrical sheets are much more active than they have been and tack plate is moving in good volume. Stamping plants in the district are busier, particularly those making kitchenware. The electrical refrigerator business is holding up. Production this week will reach 40 per cent of capacity, and the leading interest reports the heaviest sheet releases during May of any month since July, 1931. Third quarter prices have not been tested, and one large maker is not yet soliciting business for that period because of the uncertainty of manufacturing costs.

Tin Plate

Mill schedules have again been advanced sharply and are estimated this week at nearly 90 per cent of capacity. The leading interest is putting on the last of its available plants before the end of the week and many of the independents are running full. Gradual expansion in specifications indicates sustained operations for at least two months.

Scrap

The scrap market continues rather quiet for the second week. One mill bought a small tonnage of No. 1 heavy melting steel at \$11.50 and No. 2 has been sold at \$10.25. Most dealers are reluctant to sell steel at less than \$12 and the current railroad lists are expected to bring a higher figure. Quotations on the other grades are nominally unchanged. The Erie Railroad is reported to have sold 30,000 tons of scrap to a Valley mill, and the material sold recently by the Pennsylvania and the Southern is moving to consuming points rapidly. The regular monthly list of the Pennsylvania contains 23,800 tons, including 1550 tons of No. 1 heavy melting. The Baltimore & Ohio is offering 2300 tons of heavy melting and 5000 tons of rails.

Coal and Coke

Shipments of coke to local foundries are a little heavier, but the furnace grade continues quiet. Prices lack stability except on the premium grades of foundry coke, which are quoted at \$4 a net ton, Connellsville. The coal market is rather quiet, but the price structure is somewhat stronger, particularly on slack. Mines supplying by-product coke ovens are more active.

British Output 65 Per Cent, Continental Prices Awaited

LONDON, ENGLAND, May 29 (*By Cable*).—While general conditions here are improving slowly in the steel industry, the feeling prevails that if effective decisions are reached at the world conference, considerable steel tonnage would result in the form of new business. Cleveland producers, for example, are anticipating increased Scandinavian demand.

Tin plate demand is strong, accompanying dearer tin prices. Some tin plate makers are asking up to 17s. 3d. as a basis for IC on terms f.o.b. work's port.

Current British output of steel is about 65 per cent, but Continental steel business is virtually at a standstill awaiting the outcome of the present cartel meetings. It has been definitely decided that the Export Association and six sales offices will commence to function on June 1. While Continental gold prices remain unchanged from last week, reports anticipate the following probable minimum gold pound prices to be established: Beams, £2 17s. 6d.; bars, £3; plates, £4. Definite pronouncements

on prices and extras are expected within the next few days.

Negotiations are to take place in June with the view of including Swedish tube makers in the International Tube Cartel.

Self-Liquidating Loans Announced by R.F.C.

WASHINGTON, May 30.—Eight self-liquidating loans totaling about \$1,000,000 were announced last Saturday by the Reconstruction Finance Corp.

The projects were: Waldo, Fla., \$65,000 for addition to water supply system. Materials will cost \$57,340.

Guin, Ala., \$61,000, water supply system, including a 6-in. main to supply a tank of 150,000 gal.

James Madison Memorial Bridge, Inc., \$135,000, for construction of bridge across Rappahannock between Front Royal and Port Conway, Va. Will require steel and lumber.

Deer Lodge, Mont., \$180,000, new water works system, materials, including cast-iron pipe, pump, etc., to cost \$140,000.

Wyoming Development Co., and Wheatland Industrial Co., Wheatland, Wyo., \$125,000, irrigation work, including 4-mile canal and dyke.

Dixie Bridge Co., \$125,000, construction of timber trestles for toll bridge.

Arkansas State Teachers' College, Conway, Ark., \$150,000 for new dormitory and remodeling of existing one, materials to cost \$96,647.

Greenville, Miss., \$125,000, river freight terminals. Involves purchase of wharf, bridge, crane, derricks, grain handling and mooring equipment.

Reorganization Planned for Empire Steel Corp.

Plans have been developed for the reorganization of the Empire Steel Corp., Mansfield, Ohio, and the lifting of the receivership under which the company has operated since 1931. The plan that has been worked out by a committee representing bondholders and important creditors calls for a new 20-year bond issue amounting to \$3,432,000. Of this at least \$500,000 of a series A would be sold to provide working capital and the remainder in series B bonds would be issued to holders of the company's present bonds in payment of 60 per cent of their claims. Stock would be issued for the remaining 40 per cent.

British Prices f.o.b. United Kingdom Ports

Per Gross Ton			
Ferromanganese, export	£9		
Billets, open-hearth £5		to £5 7s. 6d.	
Black sheets, Japanese specifications	£11		
Tin plate, per base box	16s. 9d.	to 17s. 3d.	
Steel bars, open-hearth	£7 17½s.	to £8 7½s.	
Beams, open-hrth. £7 7½s.		to £7 17½s.	
Channels, open-hearth	£7 12½s.	to £8 2½s.	
Angles, open-hearth	£7 7½s.	to £7 17½s.	
Black sheets, No. 24 gage.....	£8 10s.		
Galvanized sheets, No. 24 gage....	£10 10s.	to £10 15s.	

Continental Prices f.o.b. Continental Ports

Per Metric Ton, Gold £ at \$4.86		
Billets, Thomas... £2 8s.		to £2 9s.
Wire rods, No. 5 B.W.G.	£4 10s.	
Black sheets, No. 31 gage, Japanese	£11 5s.	
Steel bars, merchant	£2 17s. 6d.	to £3 6d.
Beams, Thomas... £2 13s.		
Angles, Thomas 4-in. and larger	£2 16s. 6d.	
Angles, small....	£2 18s. 6d.	
Hoops and strip steel over 6-in. base	£3 12s. 6d.	
Wire, plain, No. 8	£5 7s. 6d.	
Wire nails.....	£5 15s.	
Wire, barbed, 4-pt. No. 10 B.W.G....	£8 15s.	

Chicago Steel Output Rises to 40 Per Cent of Capacity

Upward Trend of Steel Bookings Is Uninterrupted—Pig Iron Sales Have Already Exceeded Total for All of Last Year

CHICAGO, May 29.—Ingot output continues its upward course and has now reached 40 per cent of capacity. Support now coming to steel mills is the best of the year. Specifications are the heaviest since May, 1932. Sales have fallen only slightly below the record established a week ago. In fact, the difference is so slight that for all practical purposes it can be said that purchases have climbed steadily for eight weeks.

The plate market is improved, assistance coming from brewers and the oil industry. Several Western States have sizable bridge programs that are only waiting for Federal aid and others are prepared to come into the market in 30 to 60 days.

Prices remain firm and the trade is awaiting announcements of third quarter quotations.

Although there is much argument as to the trend of the scrap market, basically it appears to be on a firm footing. It is interesting to note that scrap is moving both to and from Chicago by boat.

Pig Iron

Sales of Northern foundry iron so far in 1933 exceed the total of bookings for last year. Shipments in May are fully two and one-half times the volume moved in April. Many buyers who made commitments before the price advance have again come into the market at the new quotations. Some foundries are anticipating requirements and have already specified for iron that had originally been scheduled for delivery late in June. Prices for Northern iron are firm, and silicon differentials may at any time now move up to the full 50c. charge.

Bars

Specifications from automobile manufacturers are as heavy as they have been at any time this year, suggesting that June assemblies will be fully equal to the present rate. Bar tonnage still holds its high position in the total of rolling mill output.

Plates

This commodity, long the most sluggish of the heavy tonnage products, is at last beginning to show improvement. Tank work alone this week accounts for orders to mills of 2000 tons. Unconfirmed rumors are persistent here that a large number of railroad cars are to be purchased. Many rail-

roads are figuring on wrecking large numbers of cars and locomotives.

Wire Products

Demand from manufacturers is more than sufficient to offset the usual seasonal drop in business from farm areas. Consumption of wire nails is still very light, but a moderate increase is shown in the use of copper wire, especially in the lighter gages. Prices are firm and the trade is awaiting announcement of third quarter quotations.

Structural Material

Outstanding in a quiet industrial market is an inquiry for 1200 tons of structural steel for the Inland Steel Co.'s new tin mill. Montana and the Dakotas have bridge programs that are awaiting Federal aid, but Iowa is expected to go ahead with its program in the near future. Architects report a revival of interest in private building.

Reinforcing Bars

Indiana has awarded 500 tons of reinforcing bars to be used for road work, and a public works job in Chicago has placed 150 tons on a dealer's books. Fresh inquiries are small and few in number. The new prices, now asked by sellers, have not been tested. Prospects for road work releases by the State of Illinois are improved. A law has been passed permitting purchase of cement in the open market without advertising for bids. Should the State be able to break below the prices for cement recently taken on competitive bids much work now pending will be released.

Cast Iron Pipe

Chicago is taking bids on 1000 tons of 12-in. and 375 tons of 36-in. pipe. Municipalities are beginning now to discuss plans, but actual inquiries are few in number. Prices for 6-in. and larger diameters remain in the range from \$32 to \$33 a ton, Birmingham, for delivery to the Chicago district.

Sheets

Inland Steel Co. has officially adopted the third quarter price schedule announced last week. Current quotations are steady, and buyers, convinced they are in a rising market, are moving into the market at a faster rate. The speculative element seems to be strongest among small users, particularly where changes in design of products are not important. There is no letdown in demand from

automobile manufacturers, and makers of conductor pipe and eave troughs are using heavier quantities for goods they are now making for stock. Heavier use of sheets for railroad car roof repairs and replacements is expected in the near future.

Rails and Track Supplies

The Pennsylvania has released 3250 tons of rails to Chicago mills and these are now scheduled for nearby rolling. On the whole, the rail market is very quiet and some sellers venture the opinion that it will remain so until next fall. They point out that the railroads need traffic and that heavy commitments for track work will be delayed until better earnings are assured. While track accessory business is fair, considering all conditions, yet it is lighter than mills had expected.

Scrap

Although this market is quiet, prices remain firm and the undertone is strong. Steel mills are steadily increasing their use of scrap and their stock piles are materially lower than a month ago. One steel producer has not been in the market for over a month, and dealers would not be surprised to see a 20,000 ton deal come to a head in the near future. The most recent sale of heavy melting steel brought \$8.25 a gross ton, delivered, but this was not strictly No. 1 grade and the market remains quotable at \$8.25 to \$8.75.

Scrap is moving by boat both to and away from Chicago. A shipment has arrived here from Duluth and a boatload of busheling is scheduled to leave here next week for Lake Erie. Yards are again scrapping railroad equipment, and dealers expect that the near future will bring large numbers of cars to scrap yards. Railroads are still inclined to hold the bulk of their scrap accumulations, though there are reports that considerable scrap has changed hands between producers and users without passing through dealers' hands. Manufacturers' and railroad scrap is not any too plentiful at this time.

Pipe Lines

Consumers Power Co., Jackson, Mich., is planning natural gas steel pipe line from Midland to Bay City, Mich. Line will connect at Midland with main trunk system now installed from that place to company properties in Bloomfield, Mich., gas fields, Isabella County.

Sunflower Refining Co., Hutchinson, Kan., plans 4-in. welded steel pipe line from Lyons, Kan., to Hutchinson, about 25 miles, for crude oil. Cost close to \$100,000.

Mobile Gas Service, Inc., Mobile, Ala., recently organized as a subsidiary of Consolidated Electric & Gas Co., 90 Broad Street, New York, plans steel pipe lines for natural gas supply at Mobile and several neighboring cities.

Guymon, Okla., plans early sale of bond issue of \$50,000 for municipal gas distributing plant and system, and closely following will be in market for about 13 miles of steel pipe. F. E. Devlin, Wheeler-Kelly-Hagney Building, Wichita, Kan., is consulting engineer.

Price Advances Stimulate Demand at Cleveland

Considerable Sheet and Strip Tonnage Placed for June Delivery— Ingot Output Again Increases

CLEVELAND, May 29.—Demand for sheets and strip steel has been stimulated by the announcement of price advances for the third quarter, considerable tonnage being brought out for June shipment from the automotive and other industries. Orders from diversified consumers are holding up fully to recent volume. Considerable business in finished steel is coming from oil well supply interests for development work in the Southwest. A heavy tonnage of sheets continues to come from electric refrigerator manufacturers.

The ingot output in this territory again gained this week through the starting up of an open-hearth furnace by the Otis Steel Co. in Cleveland and another furnace in Lorain. Cleveland plants are now operating at 47 per cent of capacity and this district, including Lorain, is running at 54 per cent, or a four point gain for the week. The Corrigan, McKinney Steel Co. lighted a third blast furnace Sunday.

While the recently announced third quarter prices on sheets are being named by a few producers, others are delaying naming prices for that delivery and there is some feeling that a greater advance than \$3 a ton may be justified. While buyers are anxious to cover for the third quarter, no sales are reported. Third quarter prices on bars, plates and shapes have not yet been named. Quite a few inquiries for these products for that delivery have come out.

Pig Iron

The market was rather quiet during the week, although some business was taken at the new \$15.50 price, which is being firmly held. Little inquiry is pending. Local furnaces report a considerable increase in shipping orders from foundries in this territory. Shipments to consumers in the adjoining territories, including the automotive foundries in Michigan, are holding to recent volume. The price situation in respect to Southern foundry iron for Cleveland delivery has been clarified by the reestablishment of the \$16.14 price, which has prevailed for a long time. While quotations in this territory are to be 50c. below the nearest Northern iron competition, an exception to this rule is made in that the price is not to figure back below \$10, Birmingham.

Strip Steel

Heavy specifications have come from the automotive industry for both hot and cold strip for June shipment,

and demand from other sources has expanded. Orders against old contracts will be accepted until June 15. The market is firm at 1.55c., Pittsburgh. While the 1.60c. price has been named for the third quarter, some producers are withholding announcement of a price for that delivery. With an advance to 2c., Cleveland, on cold-rolled strip by some makers, the market is firmer, although 1.80c. has not disappeared.

Sheets

The announcement of higher prices for the third quarter has brought out considerable tonnage in new business and specifications against second quarter contracts for June delivery from the automotive industry and other consumers. While considerable inquiry has come out, no third quarter sales are reported. Some stamping plants have inquiries for automobile frames and other parts for the last half of the year and would

Steel Shipments Still Gaining at St. Louis

ST. LOUIS, May 29.—Shipments of pig iron during the last week continued heavy, although new business fell off, bookings being estimated at 2500 tons. More interest is being shown in malleable grades. Steel foundries are hopefully awaiting railroad business. Automotive business shows some improvement. The market continues firm.

Steel

Granite City Steel Co. has announced an advance of \$3 a ton on galvanized sheets to 3.19c. a lb., hot-rolled annealed to 2.50c. a lb. and hot-rolled 10-gage sheets to 1.99c., delivered St. Louis, through the third quarter. With prospects for higher prices on all steel products for third quarter, shipments against contracts are increasing. Structural projects are confined mostly to Government projects. The United States Engineer's Office here will open bids June 20 for two dredge boats, requiring 100 tons.

Scrap

A sale of 5000 tons of heavy melting steel to an East Side mill for delivery during the next 60 days has been made by a group of three dealers. Several other mills are negotiating for purchases. Cast iron car wheels, No. 1 machinery cast and No. 1 rail-

like to cover for the remainder of the year. Several mills have not yet named third quarter prices and at least, one has withdrawn the announced prices for that delivery. A local mill is quoting auto body sheets at 2.65c. for the coming quarter or \$1 a ton higher than the announced price. Current orders are being taken at 2.10c. for black and 2.45c. for light cold-rolled sheets.

Bars, Plates and Shapes

Demand for merchant bars is holding fully to recent volume both from the automotive industry and from other consumers. Brewery tank work is bringing out considerable plate tonnage and inquiry is still plentiful from that source. Activity in the structural field continues light. An emergency Ohio bridge job, requiring 125-tons, has been placed. Bars are firm at 1.65c., Cleveland, and plates and shapes at 1.60c., Pittsburgh.

Scrap

The market still has a slightly weak tone, although prices are unchanged. Scrap is being shipped to mills faster than it is being consumed, and one Valley consumer has held up shipments. New buying is expected by consumers around the first of the month and these orders probably will clarify the price situation.

road cast have advanced 25c., 50c. and \$1 a ton respectively. Railroad lists: Missouri Pacific, 5000 tons; Mobile & Ohio, 1000 tons.

Warehouse Quantity Extras Changed at Buffalo

BUFFALO, May 29.—Preparations for increased blast furnace production are under way in this territory. Tonawanda Iron Corp. will blow in a furnace about June 15; Republic Steel Corp. is preparing a second furnace in the event that it is needed, and another interest is considering putting a furnace in blast. Buying continues at a steady rate. The base price for Buffalo and territories east is \$16, as heretofore. Prices further east, covering Albany and Hudson River points, have been raised from \$14 to a \$14.50 minimum with full 50c. differentials, and in some cases are even higher. This has resulted in an advance of as much as \$1.50 a ton in the case of No. 1 foundry.

Steel

The Lackawanna plant of the Bethlehem Steel Corp. is now running seven open-hearths in place of nine last week. Republic Steel Corp. continues to operate four, and Wickwire-Spencer Corp., one. The Seneca sheet division of Bethlehem is run-

ning at 30 per cent of capacity. Changes have occurred in warehouse prices in quantity lots, on bars, shapes, bands, hoops, plates, firm tread floor plates, structural plates and blue annealed sheets as follows: On lots of 400 to 999 lb., base price; on 1000 to 4999 lb., 20c. per 100 lb. reduction from base; on 5000 to 9999 lb., 40c. per 100 lb. reduction from base; on 10,000 to 39,999 lb., 60c. per 100 lb. reduction from base; 40,000 lb. and over, 75c. per 100 lb. reduction from base; on lots of 399 lb. and under, 50c. per 100 lb. advance over base.

Scrap

The market continues steady and it is understood that there has been some additional buying, but particulars are not available at this time. The largest consuming interest, which recently purchased a tonnage of heavy melting grade at \$10, has lowered its offering price.

Cast Pipe Up \$3 a Ton on Coast

SAN FRANCISCO, May 29.—The week saw a decided shortage of new projects and little steel awarded. However, considerable improvement is to be noted in the movement to build up inventories, especially on rolled products. It is reported that mills are running at full capacity on sheets, wire and tin plate. Sheet prices are firm with advances expected shortly. Plates and reinforcing bars continue weak on larger tonnages. Cast iron pipe has just been advanced \$3 a ton.

Federal projects requiring a minimum of 4280 tons of reinforcing bars and 11,300 tons of structural steel are awaiting governmental action. N. P. Severin has withdrawn his low bid on the San Francisco Federal Building, which will require 4000 tons of shapes and 700 tons of bars. Action on the Pearl Harbor, T. H., pier and quay walls, using 2000 to 3000 tons of bars, has been indefinitely postponed. The second bids for 550 tons of steel for cell equipment for the San Francisco County jail have been rejected and new figures will be taken.

April Construction Steel Bookings Down

American Institute of Steel Construction reports that with the stimulation of R. F. C. loans removed, the tonnage of steel construction booked slumped during April. For this month the bookings and shipments were both below the monthly averages of last year. It is significant, however, that although appropriations for public works were temporarily stopped completely, there was a spurt in private work which partly made up for the loss.

Demand and Output Gain in Eastern Pennsylvania

Third Quarter Sheet Prices Withdrawn by Some Mills in Anticipation of Higher Costs Under Industrial Control Act

PHILADELPHIA, May 29.—Demand for miscellaneous lines of steel continues to broaden. Buyers are experiencing better business and are covering steel requirements both because of their immediate needs and also because of the growing strength of the price structure, together with reports of impending increases in prices. It is said that the move toward higher levels is due to plans for operating under the industrial control bill soon to be taken up by the Senate in Washington, which, if passed, will mean higher wages and perhaps shortened hours.

Some sheet makers, apparently in anticipation of the readjustment, have withdrawn the advances announced last week for sheets and strip steel for third quarter delivery. These makers now are quoting second quarter prices only.

The improved demand has stepped up operations. Open-hearth output has increased four points to 22 per cent. Engagement of finishing capacity also has risen, but reflects a wide range over the different products. One nearby wire mill is reported to be operating at 100 per cent of capacity, while a nearby sheet mill producing full finished material also is producing at full capacity. A small Eastern structural mill will go on tomorrow for double turn operation during the remainder of the week. At some plants where finishing operations have increased sharply open-hearth operations are up as high as 50 and 60 per cent.

While the automotive industry is still the outstanding buyer, the trade is heartened by the spread in diversified buying.

Pig Iron

Small-lot inquiries and orders show a notable increase. While it is said that some tonnage is being bought for stock, most of it is going into consumption. The market is being well maintained at the increased price levels. Makers are not quoting beyond the third quarter.

Sheets

Withdrawal by some makers of the \$3 advance in price made last week for sheets for third quarter business is said to have been due to upward general readjustments that are expected to be made either under the industrial control legislation or independent action. These makers now are quoting only on second quarter business. Bookings have built up a good-

sized backlog and sheet mill operations are at a high rate, one unit producing at 100 per cent of capacity. Others are operating at 40 to 75 per cent of capacity. The largest buyer is the automotive industry, but substantial improvement in demand is coming from miscellaneous sources, including makers of electric refrigerators, radios and stoves.

Warehouse Business

The recent increase in demand is being maintained. Prices are unchanged.

Plates, Shapes and Bars

Mills generally report improved demand, especially for plates and merchant steel bars. Structural requirements are barely holding their own, but indications point to a pickup at an early date. The improvement in plate demand comes chiefly from breweries, heating boiler makers and tank builders.

Imports

The following iron and steel imports were received here last week: 6361 tons of manganese ore from Cuba, 997 tons of pig iron from British India and 53 tons of sponge iron from Sweden.

Scrap

Sales have moved up the price of No. 1 heavy melting steel 50c. per ton, while No. 2 heavy melting steel has advanced from \$7.50 to \$8.50.

Industrial News Items From U. S. S. R.

Moscow, April 26.—U.S.S.R. Chamber of Commerce reports that the Kaganovich ball bearing works in Moscow is planning the immediate extension of the plant and the addition of 3460 workers. Twenty-four types of bearings are now being manufactured, including tractor bearings, heretofore imported.

The Ural Machine Works has commenced the construction of a rolling mill for the Chusov plant. Capacity is to be 250,000 tons per annum and ingots weighing up to a ton will be handled.

A number of new units of the Lugansk Locomotive Works will shortly commence operations which will raise the capacity to 1080 locomotives.

Further Price Increases Expected in New York District

Another Advance on Sheets and Strips, as Well as Higher Quotations on Other Products, Looked for—Foundry Melt Expands

NEW YORK, May 29.—Demand for sheets and tin plate appears to be sustained, but there is lacking any evidence of a nearby expansion in the consumption of the heavier products. In general the hope is that the present scale of activity will continue through June, and meanwhile there must be a reappraisal as to what will be the likely outlook on the turn into the second half of the year.

Higher prices are widely looked for to cover all forms of steel and are in the main predicated on the operation of the industrial recovery legislation. It remains that tentative inquiries for railroad cars are reaching the car builders and the indications otherwise are that railroad buying will be larger rather than smaller in the next several months. The current rate of operations of the steel industry as a whole is not regarded as necessarily unstable in the absence of any measurable amount of railroad, building or oil-industry business.

While some mills are chary about granting protection for the third quarter at today's prices, some resistance from buyers is being met in the case of galvanized sheets; in this case, a 2.70c. Pittsburgh base does not look attractive so long as 2.60c. seems available. On the other side of the picture is the withdrawal by one large company of the third-quarter advances on sheets and strips with intimations that still higher prices will be in order.

The actual closing on the 7000 tons of rails for the New York Central may be postponed for a day or two, because of the overlooked intervention of Memorial Day, and it is expected that actual coverage will be for more than 8000 tons.

Pig Iron

A definite improvement in foundry operations has broadened buying for actual consuming needs. In contrast to the speculative flavor of the relatively heavy contracting in the forepart of May, the character of current demand denotes a specific betterment in melt. There is still a good deal of speculative interest, however, in the probable course of pig iron prices, following enactment of the Wagner bill. Sellers are of the opinion that passage of the bill will foreshadow higher price levels and that a substantial buying movement will attend its inception. Small-lot purchasing accounted for the bulk of last week's bookings, which approximated 6000

tons, compared with 12,000 tons the week before and 3500 tons a fortnight ago. Firmer tendencies in other metal prices today have imparted a strong tone to pig iron values. Variations from furnace base schedules have virtually disappeared, and recent advances appear to be well established. Several furnaces with comfortable backlogs are rigidly restricting offerings to delivery through September. Low phosphorus, which is in better demand, is very firm. Foreign prices are also stiffening in concert with domestic values.

Reinforcing Bars

Absence of important tonnage has afforded little test of the recent advance in distributor prices. For restricted quantities, however, quotations are well maintained at 1.60c. a lb. for mill lengths and 1.75c. a lb. for cut lengths, Pittsburgh. Small-lot demand is increasing. The projected apartment building for Fred F. French Investing Co., Inc., at New York will probably require a sizable quantity of bars. Awards in the past week were small.

Scrap

With the exception of one large-lot sale of No. 1 heavy melting steel reported for delivery in eastern Pennsylvania, this market was devoid of significant activity during the week. Although general consumer demand has abated, prices have resisted softness as a result of the reluctance of brokers to move scrap at present levels. Prices consequently remained stationary throughout the week. Demand for cast grades has not yet been stimulated by improvement in local foundry activity.

Sheet Demand Sustained at Cincinnati

CINCINNATI, May 29.—Despite a lull in market activity the past week, business volume during May was the largest in this district during the last three years. Average weekly sales of pig iron were about 1200 tons, a level slightly above that considered normal a few years ago. Furnaces are adhering strictly to recent price advances and no concessions have been granted even for tonnage orders. To a certain extent the rapid uptrend of quotations has brought requests from some consumers for protection on third quarter prices, but furnace representatives re-

fuse in the absence of specific tonnage orders. Total bookings, the past week, were about 300 tons, all in single car lots for prompt use. Shipments against contracts have been increased during the month, although in the case of a few melters they are still behind the contract rate. Moderate improvement in melt continues, but foundry operations do not reflect the sharp upturn in pig iron bookings.

Steel

A well sustained demand from virtually all sheet-consuming industries kept bookings, the past week, at slightly better than 50 per cent of capacity output. Galvanized sheets are very active, the leading interest reporting that galvanizing departments are operating at full capacity. New inquiry is light, most consumers having covered for second quarter, while the reluctance of mills to quote for third quarter is retarding bookings beyond the present quarter.

Scrap

A few quiet deals for small amounts of scrap constituted the market activity the past week. Weakness of scrap in other districts has halted the forward movement of prices here, but present quotations appear to be firm. Yard stocks are still intact and higher prices are inevitable before an adequate amount of old material is attracted into the market.

Pig Iron and Scrap Less Active at Boston

BOSTON, May 29.—There was a noticeable falling off in pig iron and scrap business the past week. Pig iron sales were well under 1000 tons. The price situation, however, appears firmer due to an advance of \$1 a ton on Dutch iron to \$15 a ton, delivered in the Providence, R. I., district. Previous to the advance a foundry contracted for its remaining 1933 requirements at \$14 a ton delivered, the contract being of a blanket nature. Sellers of Alabama iron have to submit prices to the furnace before contracts can be made. The Mystic Iron Works and Buffalo furnaces are holding firmly to price schedules. There is no open inquiry of importance in the market.

The market for No. 1 heavy melting steel, T-rails, long-bundled skeleton, forge flashings and wrought pipe is about 25c. a ton lower, and brokers have practically filled their orders for these materials. Some buying is going on in chemical borings and blast furnace scrap, but tonnages involved are comparatively small, and there is a demand for heavy breakable cast at \$4 to \$4.25 a ton on cars shipping point. Slightly better buying of textile and No. 1 machinery cast has caused slightly firmer prices.

Fabricated Structural Steel

Lettings Decline—New Projects Higher

AWARDS of 11,800 tons compare with 15,500 tons in the previous week and 3750 tons two weeks ago. The outstanding booking is 5000 tons for additions to the open-hearth soaking pit and gas producer buildings for the Great Lakes Steel Corp. at Detroit. New projects of 20,350 tons include 15,000 tons for a viaduct in New York City for the New York Central Railroad and 2200 tons for a brewery stock house for Jacob Ruppert Co., New York. Awards for the week follow:

NORTH ATLANTIC STATES

Ambler, Pa., 220 tons, gas holder for Cruse-Kemper Co., to Phoenix Bridge Co.

SOUTH AND SOUTHWEST

Louisville, Ky., 100 tons, commercial building, to Bedford Foundry & Machine Co.

Phoenix, Ariz., 250 tons, Kress store, to McClintic-Marshall Corp.

El Reno, Okla., 110 tons, State Reformatory, to Capitol Steel Co.

CENTRAL STATES

Detroit, 5000 tons, additions to open-hearth soaking pit and gas producer buildings of Great Lakes Steel Corp., to Whitehead & Kales Co.

Bainbridge, Ohio, 125 tons, highway bridge, to Burger Iron Co.

Jennings County, Ind., 105 tons, truss span, to Midland Structural Steel Co.

Moline, Ill., 800 tons, storage building for International Harvester Co., to Rock Island Bridge Co.

Chicago, 250 tons, grain elevator, to Gage Structural Steel Co., Chicago.

Lead, S. D., 1400 tons, mine shafts for Homestake Mining Co., to American Bridge Co.

Joliet, Ill., 2400 tons, bridge over Des Plaines River for Elgin, Joliet & Eastern Railway, to American Bridge Co.

WESTERN STATES

San Francisco, 700 tons, Golden Gate bridge north point caisson, to Moore Dry Dock Co.

Union Pacific Railroad, 200 tons, bridge, to an unnamed bidder.

Alaska, 120 tons, hangar for Pan-American Airways, Inc., to McClintic-Marshall Corp.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

New York, 15,000 tons, viaduct from St. John's Park Terminal to West Eighteenth Street for New York Central Railroad.

New York, 2200 tons, brewery stock house for Jacob Ruppert Co.

Lehigh-Northampton Counties, Pa., 340 tons, bridge on State highway route 175; McClintic-Marshall Corp. low bidder.

Cumberland County, Pa., 150 tons, bridge on route 708; Bates & Rogers, Cleveland, low bidder.

Baltimore, 275 tons, city boiler house.

THE SOUTH

Louisville, Ky., 250 tons, wholesale market for Swift & Co.

CENTRAL STATES

Cincinnati, 240 tons, dry dock for Island Creek Coal Co.

Indiana Harbor, Ind., 1200 tons, tin mill for Inland Steel Co.

Detroit, 320 tons, Michigan Central Railroad grade crossing.

Kenosha, Wis., 200 tons, grade crossing for Chicago North Shore & Milwaukee Railroad.

WESTERN STATES

Las Vegas, Nev., 500 tons, intake towers for Boulder Dam.

San Francisco, 550 tons, special steel for cell equipment for County jail; all bids rejected, will be readvertised.

Los Angeles, 8000 tons copper wire for Colorado River project; Columbia Steel Co. low bidder, Aluminum Co. of America low bidder on aluminum alternate.

Albany, Ore., 100 tons, State highway bridge over Santiam River; bids under advisement.

Naples, Cal., 250 tons, viaduct for Southern Pacific Railroad.

Reinforcing Steel

Awards 770 Tons

AWARDS

Chicago, 150 tons, water pumping plant, to an unnamed bidder.

State of Indiana, 500 tons, highway work; 100 tons to Concrete Engineering Co., 100 tons to Highland Iron & Steel Co., 300 tons to various bidders.

Kern County, California, 119 tons, State highway paving; to an unnamed bidder.

NEW REINFORCING BAR PROJECTS

Stanislaus and San Joaquin Counties, Cal., 145 tons, State highway bridge; Carl N. Swenson, low bidder.

Camarillo, Cal., 100 tons, State hospital units Nos. 1 and 5; Louis A. Geisler, low bidder.

Railroad Equipment

Philippine Railway Co. has placed contract with Baldwin Locomotive Works for one 2-6-0 type locomotive.

Northampton & Bath, Northampton, Pa., has purchased one 800-hp. oil-electric locomotive from Westinghouse Electric & Mfg. Co.; mechanical parts were manufactured by Baldwin Locomotive Works.

Union Pacific has ordered one light rail motor car from Pullman Car & Mfg. Co. and Winton Engine Corp.

Cast Iron Pipe

Springfield, Mass., has awarded 300 tons of 6, 8 and 12-in. to United States Pipe & Foundry Co.

Fairport, Ohio, plans installation pipe lines for water supply system. Fund of \$68,000 is being arranged for project. Lauer Engineering Co., Painesville, Ohio, is engineer.

Chicago, Department of Public Works, is taking bids on 1000 tons of 12-in. and 375 tons of 36-in.

Berryville, Ark., plans installation of about five miles of pipe for water system. Fund of \$25,000 is being arranged. E. M. Ratcliff, Fayetteville, Ark., is engineer.

State Board of Control, Capitol Building, Lincoln, Neb., plans about 4 miles of 10 and 12 in., connecting with city water system, for supply to State Reformatory and State Hospital. Fund of \$60,000 is being arranged.

General Purchasing Officer, Panama Canal, Washington, asks bids until June 6 for quantity of cast iron pipe (Schedule 2870); until June 9, cast iron pipe, pipe fittings, and two pieces wrought steel pipe (Schedule 2873).

Los Angeles has taken bids on 646 tons; American Cast Iron Pipe Co. low bidder.

San Francisco has taken bids on 394 tons of 12 and 16-in. on which Central Foundry Co. is low bidder.

Sonoma, Cal., will take bids June 7 on 268 tons of 4 to 8-in., with alternate on steel pipe.

Steel Output on Upward Trend in South

BIRMINGHAM, May 29.—Bookings of pig iron last week did not continue at the rate of the earlier weeks of May. Shipments, however, have been at an improved rate throughout the month and the May total will show a moderate increase over April. Stove plants have been taking more iron lately and there has also been a rise in the requirements of jobbing foundries. Since early April, advance bookings have been more numerous than during any equal period in the past three years. Some third quarter iron is now being sold and this tonnage seems to be slowly growing. No business is being taken by the furnaces at this time for the fourth quarter. The price is firm at \$12. There is now talk of another advance later in the summer.

Production this month will be the largest since December. Four blast furnaces are in operation, a gain of two for the month, as previously reported. Three are on foundry iron and one on basic. If the steel market maintains its present rate it is likely that the Tennessee company will blow in a second furnace.

Steel

Steel demand continues in good volume, and the past three weeks have been particularly satisfactory. May has been one of the best months in the past 16. This is reflected in ingot production. Ten open-hearths were worked all of last week and this same number is scheduled for this week. With the exception of a period in last June, this number has not been equaled since February, 1932. There is a possibility that 11 may be in operation before the end of the week, and one of these may be No. 9, at Fairfield, built four years ago but never operated regularly.

New business still consists of small, varied orders, but in sufficient quantity to make sizable tonnage. Structural shape demand improved somewhat last week, and the call for plates and railroad products was better. Some satisfactory inquiries for these heavier products are now pending.

The rail mill of the Tennessee Coal, Iron & Railroad Co., which has been operated periodically during the year, has resumed operations for another week's run.

The cotton tie season opened May 15, about a month earlier than usual, and tonnage that usually comes later is now being booked this month and has helped to swell the current volume.

Non-Ferrous Metals Soaring With Demand Heavy

Copper at 7.50c.—Tin Advances Above 39c.—
Zinc and Lead Very Strong

NEW YORK, May 29.—Heavy inquiry, increased sales and advancing prices of all metals have resulted from the prospective passage of the National Recovery Act. London prices of all metals advanced sharply today.

Copper

Sales of copper, for both domestic and foreign consumption, have been heavy and prices have advanced. Demand from consumers here has met with some resistance from producers, because of the prospect of higher prices, so that sales have not in all cases followed inquiries. Most transactions have covered deliveries through September. It is generally stated that 7c. copper is being sold at a loss. Demand abroad has also been and still is active, with sales made during the past week from 7.05c. to 7.40c. a lb., c.i.f. European ports. Exporters re-

port sales today at 7.35c. to 7.40c. a lb. Fabricators are very busy, so that it is estimated that more metal is going into consumption than is being made, thus measurably reducing stocks. Electrolytic copper, which was available on Saturday, May 27, at 7.25c. a lb., delivered Connecticut, was advanced today to 7.50c., at which level sales of sizable tonnages are reported. Lake copper is also higher at 7.75c., delivered New York.

Lead

Demand has been and is so insistent, with sales in such large volume, that there have been two advances in prices with the week. The last one was today when, in a very active market, the leading producer boosted its New York quotation up 15 points to 3.90c. a lb. The leading independents then advanced their price to 3.75c., St. Louis. Most of

the June requirements, amounting to about 25,000 tons, have been sold and already there have been some bookings for July delivery. A feature of the situation is the anticipation by some consumers of their contracts. For example, one large user who contracted for a large tonnage for June-July shipment has requested most of this for spot and early delivery. It is generally conceded that the metal is going into consumption.

Zinc

Inquiry from consumers and reluctance to sell on the part of producers have resulted in daily advances in quotations. Today the market is quite generally described as "boiling" with a reliable estimate of prices almost impossible. Sales were made on Saturday of prime Western at 4.10c. a lb., East St. Louis, but today quotations range all the way from 4.15 to 4.25c. In the present chaotic state of the market and with some producers insisting on 4.25c., the foregoing range is a fair appraisal. General opinion is to the effect that most of the metal is going into consumption. Ore prices were again higher on Saturday at \$29 per ton, an advance of \$2 over that of a week ago. This is another factor in the higher price of the metal.

Late today the lowest quotation was 4.20c., East St. Louis, at which some sales were made. Earlier in the day there were transactions at 4.15c. For the day the buying was moderately large.

Tin

Importers describe the week's activity as one of "tremendous" buying at steadily advancing prices. With the tin plate industry operating at about 90 per cent of capacity and with automobile makers maintaining ample schedules—the two largest consumers of tin—the buying is easily understood. With stocks in users' hands light, most of the metal is being consumed rapidly. Spot Straits tin was quoted today at 39.25c. a lb., New York, the highest since late in January, 1930. Deliveries of tin into American consumption for May were large and estimated at 5000 tons. London quotations today were posted at £198 2s. 6d. for spot standard, at £198 7s. 6d. for future standard, and at £215 12s. 6d. for spot Straits, all about £12 a ton higher than on May 23. The Singapore price today was £216 15s. a ton, registering an advance of nearly £13 since May 23.

In an item describing the cold strip mill which the United Engineering & Foundry Co., Pittsburgh, has built for the American Sheet & Tin Plate Co., which appeared in THE IRON AGE of May 25, page 833, the pressure between the rolls was erroneously stated as being up to 12,000 lb. The figure should have been 12,000,000. The cast steel housings used in the mill weighed 230,000 lb. over all.

The Week's Prices. Cents Per Pound for Early Delivery

	May 24	May 25	May 26	May 27	May 29
Electrolytic copper, N. Y.*	6.75	6.75	7.00	7.00	7.25
Lake copper, New York	7.00	7.00	7.25	7.25	7.50
Straits tin, Spot, N. Y.	37.00	37.00	37.12½	...	39.25
Zinc, East St. Louis	3.85	3.90	3.95	4.10	4.20
Zinc, New York	4.22	4.27	4.32	4.47	4.57
Lead, St. Louis	3.52½	3.60	3.60	3.60	3.75
Lead, New York	3.65	3.75	3.75	3.75	3.90

*Refinery quotations; price ¼c. higher delivered in Connecticut.

Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 6.25c. a lb. New York.
Brass ingots, 85-5-5-5, 7.75c. a lb., New York and Philadelphia.

From New York Warehouse Delivered Prices, Base per Lb.

Tin, Straits pig	41.00c. to 42.00c.
Tin, bar	43.00c. to 44.00c.
Copper, Lake	8.00c. to 8.75c.
Copper, electrolytic	7.75c. to 8.25c.
Copper, castings	7.50c. to 8.50c.
*Copper sheets, hot-rolled	14.87½c.
*High brass sheets	12.62½c.
*Seamless brass tubes	14.25c.
*Seamless copper tubes	14.32½c.
*Brass rods	10.12½c.
Zinc, slabs	5.00c. to 5.50c.
Zinc sheets (No. 9), casks	9.25c. to 9.50c.
Lead, American pig	4.75c. to 5.75c.
Lead, bar	6.25c. to 7.25c.
Lead, sheets	7.50c.
Antimony, Asiatic	8.00c. to 9.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent	17.00c. to 18.00c.
Solder, ½ and ½	25.50c. to 26.50c.
Babbitt metal commercial grade	21.00c. to 42.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse Delivered Prices per Lb.

Tin, Straits pig	39.50c.
Tin, bar	41.50c.

Copper, Lake	8.37½c.
Copper, electrolytic	8.37½c.
Copper, casting	8.00c.
Zinc, slab	4.50c. to 5.00c.
Lead, American pig	4.50c. to 5.00c.
Lead, bar	8.00c.
Antimony, Asiatic	8.50c.
Babbitt metal, medium grade	17.75c.
Babbitt metal, high grade	43.50c.
Solder, ½ and ½	23.75c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	5.75c.	6.50c.
Copper, hvy. and wire	5.50c.	6.375c.
Copper, light and bottoms	4.50c.	5.25c.
Brass, heavy	3.00c.	3.75c.
Brass, light	2.50c.	3.00c.
Hvy. machine composition	4.25c.	5.00c.
No. 1 yel. brass turnings	3.50c.	4.25c.
No. 1 red brass or compos. turnings	3.75c.	4.25c.
Lead, heavy	3.00c.	3.375c.
Zinc	2.00c.	2.50c.
Cast aluminum	5.50c.	6.50c.
Sheet aluminum	11.00c.	12.25c.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c.
Del'd Philadelphia	1.91c.
Del'd New York	1.95c.
Del'd Detroit	1.90c.
F.o.b. Cleveland	1.65c.
F.o.b. Lackawanna	1.70c.
F.o.b. Birmingham	1.75c.
C.I.F. Pacific ports	2.10c.

Billet Steel Reinforcing

(Cut lengths as quoted by distributors)

F.o.b. P'gh mills	1.55c. to 1.75c.
F.o.b. Birmingham	1.55c. to 1.75c.
F.o.b. Cleveland	1.55c. to 1.75c.
F.o.b. Chicago	1.55c. to 1.90c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.30c.
F.o.b. Chicago Heights	1.30c.
F.o.b. mills	1.30c. to 1.65c.

Iron

Common iron, .. . Chicago	1.60c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	1.86c.
Common iron, del'd New York	1.90c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c.
F.o.b. Birmingham	1.75c.
Del'd Cleveland	1.8035c.
Del'd Philadelphia	1.4935c. to 1.5935c.
F.o.b. Coatesville	1.40c. to 1.50c.
F.o.b. Sparrows Point	1.40c. to 1.50c.
Del'd New York	1.598c. to 1.698c.
C.I.F. Pacific ports	2.00c.
Wrought iron plates, f.o.b. P'gh	3.00c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c.
F.o.b. Birmingham	1.75c.
F.o.b. Lackawanna	1.70c.
F.o.b. Bethlehem	1.70c.
Del'd Cleveland	1.8035c.
Del'd Philadelphia	1.7495c.
Del'd New York	1.8675c.
C.I.F. Pacific ports (wide flange)	2.10c.
C.I.F. Pacific ports (wide flange)	2.20c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago mill	2.05c.
F.o.b. Buffalo	2.00c.

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago, Buffalo, Massillon or Canton.)	
Alloy Quantity Bar Base,	2.45c. to 2.65c. per Lb.

S.A.E. Series	Alloy	Differential
Numbers	per 100 Lb.	
2000 (1% Nickel)		0.25
3100 (1 1/2% Nickel)		0.55
3200 (3% Nickel)		1.50
3500 (5% Nickel)		2.25
3100 Nickel Chromium		0.55
3200 Nickel Chromium		1.35
3400 Nickel Chromium		3.40
3400 Chromium Molybdenum (0.16 to 0.25 Molybdenum)		0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)		0.70
4400 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.50 to 2.00 Nickel)		1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)		0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)		0.45
5100 Chromium Spring Steel		0.20
6100 Chromium Vanadium Bar		1.20
4100 Chromium Vanadium Spring Steel		0.95
9250 Silicon Manganese Spring Steel (flat)		0.25
Rounds and Square		0.50
Chromium Nickel Vanadium		1.50
Carbon Vanadium		0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is 1/2c. a lb. higher, with standard classification for cold-finish alloy steel bars applying. For billets 1 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. and less than 2 1/2 in. thick, regardless of sectional area, take the bar price.

Cold Finished Bars*

Bars, f.o.b. Pittsburgh Mill	1.70c.
Bars, f.o.b. Chicago	1.75c.
Bars, Cleveland	1.75c.
Bars, Buffalo	1.75c.
Bars, Detroit	1.90c.
Bars, eastern Michigan	1.95c.
Shafing, ground, f.o.b. mill,	1 1/2 in. 3.00c.
	1-3/16 to 1 1/2 in. 2.50c.
	1-9/16 to 1 1/2 in. 2.35c.
	1-15/16 to 2 1/2 in. 2.20c.
	2-15/16 to 6 in. 2.05c.

* In quantities of 10,000 to 19,999 lb.

SHEETS, STRIP, TIN PLATE

TERNE PLATE

Sheets

Hot-Rolled

No. 10, f.o.b. Pittsburgh	1.50c. to 1.65c.
No. 10, f.o.b. Chi'o mill	1.60c. to 1.75c.
No. 10, del'd Philadelphia	1.81c. to 1.96c.
No. 10, f.o.b. Birmingham	1.65c. to 1.80c.
No. 10, c.i.f. Pacific Coast ports	2.12 1/2c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.10c. to 2.25c.
No. 24, f.o.b. Chi'o mills	2.20c. to 2.35c.
No. 24, del'd Philadelphia	2.41c. to 2.56c.
No. 24, f.o.b. Birmingham	2.25c. to 2.40c.
No. 24, c.i.f. Pacific Coast ports	2.73c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled (Mill Run)

No. 10 gage, f.o.b. Pitts'h	1.95c.
No. 10 gage, f.o.b. Chicago mills	2.05c.
No. 10 gage, del'd Phila.	2.71c.
No. 10 gage, del'd Pacific Coast ports	2.70c.

Light Cold-Rolled (Mill Run)

No. 20 gage, f.o.b. Pitts'h	2.40c.
No. 20 gage, f.o.b. Chicago mills	2.50c.
No. 20 gage, del'd Phila.	2.71c.
No. 20 gage, del'd Pacific Coast ports	2.95c.

Auto Body and Steel Furniture

No. 10, f.o.b. Pittsburgh	2.15c.
No. 20, f.o.b. Pittsburgh	2.60c.
No. 20, f.o.b. Chicago	2.70c.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	2.70c. to 2.85c.
No. 24, f.o.b. Chicago mills	2.90c.
No. 24, del'd Philadelphia	3.16c.
No. 24, f.o.b. Birmingham	2.85c.
No. 24, c.i.f. Pacific Coast ports	3.35c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Term

No. 24, unassorted, 8-lb. coil	f.o.b. Pittsburgh, 2.75c. to 2.90c.
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Tinplate Enamel stock

No. 20, 10-lb. Pittsburgh	2.90c.
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Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.30c.
No. 28, Chicago mill	2.40c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mill	\$4.25
Standard cokes, f.o.b. Gary	4.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	\$8.70
15-lb. coating I.C.	11.00
20-lb. coating I.C.	11.90
25-lb. coating I.C.	13.00
30-lb. coating I.C.	13.30
40-lb. coating I.C.	15.30

Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 in.

	Base per Lb.
All widths up to 24 in., Pittsburgh	1.55c. to 1.60c.
All widths up to 24 in., Chicago	1.65c. to 1.70c.
Cooperage stock, P'gh	1.55c. to 1.60c.
Cooperage stock, Chicago	1.65c. to 1.70c.

Cold-Rolled Strips

F.o.b. Pittsburgh	2.00c.
F.o.b. Cleveland	1.80c. to 2.00c.
Del'd Chicago	2.30c.
F.o.b. Worcester	2.15c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	2.60c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)
Extras of 10c. a 100 lb. on mixed and joint carloads, 20c. on pool carloads and 30c. on less than carloads are applied on all merchant wire products. In carloads and mixed carloads a discount of 10 per cent on extras is allowed.

To Manufacturing Trade

Bright wire	2.10c.
Spring wire	3.10c.

To Jobbing Trade

	Base per Keg
Standard wire nails	\$1.85
Smooth coated nails	1.85
Galvanized nails	3.35
	Base per 100 Lb.
Smooth annealed wire	\$2.25
Smooth galvanized wire	2.40
Polished staples	2.55
Galvanized staples	2.50
Barbed wire, galvanized	2.55

Woven wire fence No. 9 gage, base column, per net for \$50.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base; Duluth, Minn. and Worcester, Mass., mill \$2 a ton over Pittsburgh, and Birmingham mill \$3 a ton over Pittsburgh.

STEEL AND WROUGHT PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio Mills

	Steel	Wrought Iron
Inches	Black Galv.	Black Galv.
1/2	55 33	1 1/2 +91 1/2 +138
3/4	60 42	1 3/4 +1 1/2 +21 1/2
1	65 54	2 +31 1/2 15
1 1/4	65 54	2 1/2 +36 1/2 20 1/2
1 3/4	71 62	2 3/4 +39 1/2 25 1/2
2		3 +43 1/2 28
2 1/2		3 1/2 +41 1/2 26

	Lap Weld
2	66 57
2 1/2 to 6	69 1/2
7 and 8	68 58
9 and 10	67 57
11 and 12	66 56

	Butt Weld, extra strong, plain ends
1 1/2	52 37
1 3/4	58 45
2	63 54
2 1/4	68 59
2 3/4	70 62

	Lap Weld, extra strong, plain ends
2 1/2	65 57
2 3/4 to 6	69 61
7 to 8	68 58
9 and 10	67 57
11 and 12	66 56

Discounts on steel and wrought iron pipe are net and not subject to any points or preferentials.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

	Steel	Charcoal Iron
2 in. and 2 1/2	35	1 1/2 in. 1
3 in.	38	1 3/4 in. 8
3 1/2 in.—2 1/2 in. 46		2 in.—2 1/2 in. 13
3 in.	52	2 1/2 in.—2 1/2 in. 16
3 1/2 in.—4 in. 54		3 in. 17
4 in.	57	3 1/2 in. 3 1/2
4 1/2 in. to 6 in. 46		4 in. 18
		4 1/2 in. 20
		4 in. 21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap welded steel—Under 10,000 lb. 6 points under base and one five; 10,000 lb. to carload 4 points under base and two fives. Charcoal iron—Under 10,000 lb. 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

	Cold-Drawn
1 in.	61
1 1/4 to 1 1/2 in.	53
1 1/2 in.	57
2 to 2 1/2 in.	52
2 1/2 to 3 in.	40
3 in.	46
3 1/2 to 3 1/2 in.	48
4 in.	51
4 1/2, 5 and 6 in.	40

	Hot Rolled
2 and 2 1/2 in.	38
2 1/2 and 3 in.	46
3 in.	52
3 1/2 to 3 1/2 in.	54
4 in.	57
4 1/2, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb. base discounts are reduced 6 points with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. in lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 40% base	50
Plus differential for lengths over 15 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

RAILS AND TRACK SUPPLIES

Rails

	Per Gross Ton
Standard, f.o.b. mill	\$40.00
Light (from billets), f.o.b. mill	30.00
Light (from rail steel, f.o.b. mill)	28.00

Track Equipment

	Base per 100 Lb.
Spikes, 9/16 in. and larger	\$2.15
Spikes, 1/2 in. and larger	2.30
Spikes, boat and barge	2.60
Tie plates, steel	1.75
Angle bars to steam railroads	3.55
Track bolts, to jobbers, all sizes, (per 100 count)	.73 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

	Per Cent Off List
Machine bolts	75
Carriage bolts	73
Lag bolts	73
Plow bolts, Nos. 1, 2, 3 and 7 heads	73
Hot-pressed nuts, blank or tapped, square	75
Hot-pressed nuts, blank or tapped, hexagonal	75
C.n.c. and t. square or hex nuts, blank or tapped	75

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	75
Semi-finished hexagon castellated nuts, S.A.E.	75
Store bolts in packages, P'gh	75, 25 and 10
Store bolts in packages, Chicago	75, 25 and 10
Store bolts in bulk, Cleveland	75, 25 and 10
Store bolts in bulk, Chicago	86
Store bolts in bulk, Cleveland	86
Tire bolts	60 and 10
Discounts of 75 per cent off on bolts and nuts applied on carload business with jobbers and large consumers.	

Large Rivets

	Base per Lb.
F.o.b. Pittsburgh or Cleveland	\$2.25
F.o.b. Chicago	2.35

Small Rivets

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 10
F.o.b. Cleveland	70, 10 and 10
F.o.b. Chicago	70, 10 and 10

Cap and Set Screws

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	85
Milled standard set screws, case hardened, 1 in. dia. and smaller	86
Milled headless set screws, cut thread 1/2 in. and smaller	75 and 10
Unset hex. head cap screws, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller	85 and 10
Unset set screws, sq. head	80
Milled studs	70

SEMI-FINISHED STEEL

Billets and Blooms

	Per Gross Ton
Re-rolling, 4-in. to 6-in., inclusive	\$26.00
Re-rolling, 4-in. to 6-in., inclusive	26.00
Re-rolling, 4-in. to 6-in., inclusive	26.00
Re-rolling, 4-in. to 6-in., inclusive	26.00
Re-rolling, 4-in. to 6-in., inclusive	26.00
Forging quality, Pittsburgh	31.00
Forging quality, Youngstown	31.00

Sheet Bars

	Per Gross Ton
Pittsburgh	\$26.00
Youngstown	26.00
Cleveland	26.00

Slabs

	Per Gross Ton
(3 in. x 2 in. and under 10 in. x 10 in.)	\$26.00
Youngstown	26.00
Youngstown	26.00
Cleveland	26.00

Slabs

	Per Gross Ton
(3 in. x 2 in. and under 10 in. x 10 in.)	\$26.00
Youngstown	26.00
Youngstown	26.00
Cleveland	26.00

Slabs

	Per Gross Ton
(3 in. x 2 in. and under 10 in. x 10 in.)	\$26.00
Youngstown	26.00
Youngstown	26.00
Cleveland	26.00

Slabs

	Per Gross Ton
(3 in. x 2 in. and under 10 in. x 10 in.)	\$26.00
Youngstown	26.00
Youngstown	26.00
Cleveland	26.00

Slabs

Skelp	
(F.o.b. Pittsburgh or Youngstown)	
	Per Lb.
Grooved	1.60c.
Universal	1.60c.
Sheared	1.60c.

Wire Rods	
(Common soft, base)	
	Per Gross Ton
Pittsburgh	\$35.00
Cleveland	35.00
Chicago	36.00

COKE, COAL AND FUEL OIL

Coke	
	Per Net Ton
Furnace, f.o.b. Connellsville	\$1.75 to \$2.00
Prompt, f.o.b. Connellsville	2.50 to 4.00
Foundry, by-product, Chicago ovens, for delivery outside switching districts	7.00
Foundry, by-product, delivered in Chicago switching districts	7.75
Foundry, by-product, New England, delivered	10.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila. land, delivered	7.82
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.80
Foundry, by-product, del'd St. Louis	9.00

Coal	
	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.10 to \$1.20
Mine run coking coal, f.o.b. W. Pa. mines	1.20 to 1.40
Gas coal, 4-in., f.o.b. Pa. mines	1.30 to 1.40
Mine run gas coal, f.o.b. Pa. mines	1.30 to 1.40
Steam slack, f.o.b. W. Pa. mines	0.45 to 0.55
Gas slack, f.o.b. W. Pa. mines	0.65 to 0.75

Fuel Oil	
	Per Gal. f.o.b. Bayonne, N. J.
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
Per Gal. f.o.b. Baltimore	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
Per Gal. del'd Chicago	
No. 3 industrial fuel oil	3.25c.
No. 5 industrial fuel oil	2.65c. to 2.75c.
Per Gal. f.o.b. Cleveland	
No. 3 distillate	5.00c.
No. 4 industrial	4.50c.

REFRACTORIES

Fire Clay Brick	
	Per 1000 f.o.b. Works
	High-heat Intermediate Duty Brick
Penn.	\$33.00 to \$35.00
Maryland	35.00
New Jer.	\$44.00 to \$7.00
Ohio	35.00
Kentucky	35.00
Missouri	35.00
Illinois	35.00
Ground fire clay, per ton	6.50

Chrome Brick	
	Per Net Ton
Standard size	\$12.50 to \$45.00

Silica Brick	
	Per 1000 f.o.b. Works
Pennsylvania	\$33.00 to \$35.00
Chicago	47.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick	
	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	\$61.50 to \$65.00
Unburned, f.o.b. Baltimore	52.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	\$38.50 to 45.00
Domestic, f.o.b. Chewelah, Wash.	20.90

CAST IRON PIPE	
	Per Net Ton
6-in. and larger, del'd Chicago	\$41.40
4-in., del'd Chicago	44.40
6-in. and larger, del'd New York	35.30 to 36.30
4-in., del'd New York	38.30 to 39.30
6-in. and larger, Birm'ham	33.00
4-in., Birm'ham	36.00
Class "A" and gas pipe, \$3 extra.	

Pig Iron, Ores, Ferroalloys

VALLEY

Per Gross ton, f.o.b. Valley furnace:	
Basic	\$15.00
Bessemer	16.00
Gray forge	15.50
No. 2 foundry	15.50
No. 3 foundry	15.00
Malleable	15.50
Low phos., copper free	23.00

Freight rate to Pittsburgh or Cleveland district, \$1.89.

PITTSBURGH

Per Gross ton, f.o.b. Pittsburgh district furnace:	
Basic	\$15.50
No. 2 foundry	16.00
No. 3 foundry	15.50
Malleable	16.00
Bessemer	16.50

Freight rates to points in Pittsburgh district range from 69c. to \$1.26.

CHICAGO

Per gross ton at Chicago furnaces:	
N'th'n No. 2 fdy.	\$16.00
N'th'n No. 1 fdy.	16.50
Malleable, not over 2.25 sil.	16.00
High phosphorus, f.o.b.	16.00
Lake Super. charcoal, sil. 1.50, by rail	23.17
Southern No. 2 fdy.	\$16.14 to 17.14
Low phos., sil. 1 to 2, Copper free	25.00
Silvery, sil. 8 per cent.	24.92
Bess. ferro-sil'n, 15 per cent.	28.92

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including a switching charge.

ST. LOUIS

Per gross ton at St. Louis:	
No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	\$16.00
Del'd St. Louis	16.85
Malleable, f.o.b. Granite City	16.50
Northern No. 2 fdy., del'd St. Louis	18.30
Northern malleable, del'd	18.30
Northern basic, del'd	18.30
Southern fdy., sil. 1.75 to 2.25 del'd St. Louis	16.35

Freight rates 83c. (average) Granite City to St. Louis; \$2.30 from Chicago; \$4.56 from Birmingham.

NEW YORK

Per Gross ton, delivered New York district:	
*Buffalo, No. 2, del'd east	\$17.41
N. J.	
Buffalo malleable, del'd Eastern	17.91
East Pa. No. 2 fdy.	17.02
East Pa. No. 2X fdy.	17.52

Freight rates: \$1.52 to \$2.63 from eastern Pennsylvania.
*Prices delivered to New Jersey cities having rate of \$3.41 a ton from Buffalo.

BUFFALO

Per gross ton, f.o.b. furnace:	
No. 2 fdy.	\$16.00
No. 2X fdy.	16.50
No. 1 fdy.	17.50
Malleable, sil. up to 2.25	16.50
Basic	14.00
Lake Superior charcoal, del'd	23.41

CINCINNATI

Per gross ton, delivered Cincinnati:	
Ala. fdy., sil. 1.75 to 2.25	\$16.51
Ala. fdy., sil. 2.25 to 2.75	16.76
Tenn. fdy., sil. 1.75 to 2.25	16.51
N'th'n No. 2 foundry	\$17.01 to 18.19
S'th'n Ohio silvery, 8%	21.39

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.82 from Birmingham.

CLEVELAND

Per gross ton at Cleveland furnace:	
N'th'n No. 2 fdy.	\$15.50
Malleable	15.50
Ohio silvery, 8 per cent.	23.00
Basic (del'd east Pa.)	23.00
Southern No. 2 fdy.	16.14

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 63c. average local switching charge; \$3.00 from Jackson, Ohio; \$6.14 from Birmingham.

PHILADELPHIA

Per gross ton at Philadelphia:	
East. Pa. No. 2	\$16.84
East. Pa. No. 2X	17.34
East. Pa. No. 1X	16.09
Basic (del'd east Pa.)	16.09
Malleable	16.84
Stand. low phos. (f.o.b. east Pa. furnace)	\$22.00 to \$23.00
Cop. b'rg low phos. (f.o.b. furnace)	22.00 to 23.00
Va. No. 2	21.79
Va. No. 2X	22.29

Prices, except as specified otherwise, are del'd Philadelphia. Freight rates: \$4c. to \$1.79 from eastern Pennsylvania furnaces; \$4.67 from Virginia furnaces.

BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnace:	
No. 2 fdy., 1.75 to 2.25 sil.	\$12.00
No. 2 soft, 2.25 to 2.75 sil.	12.50
Basic	12.00

NEW ENGLAND

Per gross ton delivered Boston and nearby New England points:	
Buffalo, sil. 1.75 to 2.25	\$18.53 to \$19.04
Buffalo, sil. 2.25 to 2.75	18.53 to 19.04
Ala., sil. 1.75 to 2.25	18.00 to 18.50

CANADA

Per gross ton:	
Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$22.60
No. 2 fdy., sil. 1.75 to 2.75	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	\$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	23.00 to 23.50

Ferromanganese

Per Gross Ton	
Domestic, 80%, seaboard	\$68.00
Foreign, 80%, Atlantic or Gulf port, duty paid	61.00

Prices for lots of one carload or more; extras applied on less than carload lots.

Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$24.00

Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads)	\$74.50
50% (less carloads)	82.00
75% (carloads)	120.00
75% (less carloads)	130.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads)	31.00
14% to 16% (less carloads)	36.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace	
Per Gross Ton	Per Gross Ton
10%	\$21.50
11%	22.00
12%	22.50
13%	23.00
14%	\$23.50
15%	24.00
16%	24.50

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace	
Per Gross Ton	Per Gross Ton
6%	\$19.00
7%	19.50
8%	20.00
9%	20.50
10%	21.00
11%	21.50
12%	\$22.00
13%	22.50
14%	23.00
15%	23.50
16%	24.00

Other Ferroalloys

Ferrotungsten, per lb. wo. del. car-loads	94c.
Ferrotungsten, less carloads	\$1.00
Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr. per lb. contained Cr. delivered, in car-loads	9.50c.
Ferrocromium, 2% carbon	16.50c. to 17.00c.

PITTSBURGH

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$11.00 to \$12.00
No. 2 heavy melting steel	10.00 to 10.50
No. 2 railroad wrought	11.50 to 12.00
Scrap rails	11.50 to 12.00
Rails 3 ft. and under	12.50 to 13.00
Sheet bar crops, ordinary	12.00 to 12.50
Compressed sheet steel	11.00 to 12.00
Hand bundled sheet steel	10.00 to 10.50
Hot steel axle turnings	9.50 to 10.00
Machine shop turnings	8.25 to 8.75
Short shov. steel turnings	7.00 to 7.50
Short mixed borings and turnings	7.50 to 8.00
Cast iron borings	7.50 to 8.00
Cast iron car wheels	11.00 to 11.50
Heavy breakable cast	9.00 to 9.50
No. 1 cast	10.00 to 11.00
Railr. knuckles and couplers	13.00 to 14.00
Rail, coil and leaf springs	13.00 to 14.00
Boiled steel wheels	13.00 to 14.00
Low phos. billet crops	14.00 to 14.50
Low phos. sheet bar crops	13.50 to 14.00
Low phos. plate scrap	13.50 to 14.00
Low phos. punchings	13.50 to 14.00
Steel car axles	13.00 to 13.50

CHICAGO

Delivered Chicago district consumers:	
Per Gross Ton	
Heavy melting steel	\$8.25 to \$8.75
Shoveling steel	8.25 to 8.75

Ferrocromium, 1% carbon	17.50c. to 18.00c.
Ferrocromium, 0.10% carbon	19.50c. to 20.00c.
Ferrocromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovandium, del. per lb. contained Va.	\$2.60 to \$3.00
Ferrocobaltitium, 15 to 18%, per net ton, f.o.b. furnace in car-loads	160.00
Ferrophosphorus, electric, or blast furnace material, in carloads	
18% Rockdale, Tenn., base, per gross ton with \$2 unitage	50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with \$2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	\$36.00
Ton lots or less, per ton	41.00
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	55.00
2% carbon grade	50.00
1% carbon grade	100.00
Spot prices	\$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports	
	Per Gross Ton
Old range Bessemer, 51.5% iron	\$4.80
Old range, non-Bessemer, 51.50% iron	4.85
Mesabi Bessemer, 51.50% iron	4.85
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore	
	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	7.50c.
Iron, low phos., Swedish, average 68 1/2% iron	8c.
Iron, basic or foundry, Swedish, average, 65% iron	7.50c.
Iron, basic or foundry, Russian, aver. 63% iron (nom.)	7.50c.
Manganese, Caucasian, washed 52%	18c.
Manganese, African, Indian, 50-52%	18c.
Manganese, Brazilian, 46 to 48%	16c.
Tungsten, Chinese wolframite, duty paid	Per Net Ton \$10.00
Tungsten, domestic scheelite	Per Gross Ton \$8.00 to \$10.00
Chrome, 45%, Cr2O3, crude, c.i.f.	16.00
Chrome, 48%, Cr2O3, c.i.f. Atlantic seaboard	18.00

*Quotations nominal in absence of sales.

Fluorspar

Per Net Ton	
Domestic, washed gravel 85-5, f.o.b. Kentucky and Illinois mines	\$10.50 to \$11.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	13.50
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	\$16.00 to 16.75
Domestic, No. 1 ground bulk, 85 to 98% calcium fluoride, not over 2 1/4% silicon, f.o.b. Illinois and Kentucky mines	30.00

Iron and Steel Scrap

Hydraulic comp. sheets	\$7.00 to \$7.50
Drop forge flashings	6.25 to 6.75
No. 1 busheling	7.00 to 7.50
Roller car wheels	9.50 to 10.00
Railroad tires	9.50 to 10.00
Railroad leaf springs	9.50 to 10.00
Axle turnings	7.00 to 7.50
Steel couplers and knuckles	9.50 to 10.00
Coil springs	9.50 to 10.00
Axle turnings (elec. fur.)	7.50 to 8.00
Low phos. punchings	9.50 to 10.00
Low phos. plates, 12 in. and under	9.50 to 10.00
Cast iron borings	5.00 to 5.50
Short shoveling turnings	5.00 to 5.50
Machine shop turnings	5.00 to 5.50
Revolving rails	9.50 to 10.00
Steel rails, less than 3 ft.	9.50 to 10.00
Steel rails, less than 2 ft.	10.00 to 10.50
Angle bars, steel	9.50 to 10.00
Cast iron car wheels	9.50 to 10.00
Railroad malleable	9.75 to 10.25
Agricultural malleable	7.50 to 8.00

Per Net Ton

Iron car axles	\$12.50 to \$13.00
Steel car axles	10.50 to 11.00
No. 1 railroad wrought	6.50 to 7.00
No. 2 railroad wrought	7.50 to 8.00

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50 to 7.50
50 to 8.00

No. 2 busheling	\$4.00 to \$4.50
Locomotive tires, smooth	7.50 to 8.50
Pipe and flues	1.25 to 1.75
No. 1 machinery cast	8.75 to 9.25
Clean automobile cast	8.75 to 9.25
No. 1 railroad cast	8.50 to 9.00
No. 1 agricultural cast	8.00 to 8.50
Stove plate	7.00 to 7.50
Grate bars	6.75 to 7.25
Brake shoes	8.00 to 8.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$9.00 to \$9.50
No. 2 heavy melting steel	3.00 to 3.50
No. 1 railroad wrought	11.00
Bundled sheets	4.00 to 4.50
Hydraulic compressed, new	6.00
Hydraulic compressed, old	5.00
Machine shop turnings	5.00 to 5.50
Heavy axle turnings	7.50 to 8.00
Cast borings	3.50 to 3.75
Heavy breakable cast	9.50
Stove plate (steel work)	7.00 to 7.50
No. 1 low phos. heavy	11.00 to 11.50
Couplers and knuckles	10.00 to 10.50
Roller steel wheels	10.00 to 10.50
No. 1 blast furnace	3.50 to 3.75
Spec. iron and steel pipe	12.00 to 13.50
Shafting	13.00 to 13.50
Steel axles	13.00 to 13.50
No. 1 forze fire	5.50 to 6.00
Cast iron car wheels	9.50 to 10.00
No. 1 cast	10.00 to 10.50
Cast borings (No. 24)	10.00 to 10.50
Steel rails for rolling	9.50 to 10.00

CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$9.00 to \$9.50
No. 2 heavy melting steel	8.50 to 9.00
Compressed sheet steel	9.00 to 9.50
Light bundled sheet stamp-	
ings	6.50 to 7.00
Drop force flashings	8.00 to 8.50
Machine shop turnings	5.75 to 6.00
Short shoveling turnings	6.75 to 7.25
No. 1 busheling	7.50 to 8.00
Steel axle turnings	7.50 to 8.00
Low phos. billet crops	12.00 to 12.50
Cast iron borings	6.25 to 6.75
Mixed borings and short	
turnings	6.25 to 6.75
No. 2 busheling	6.25 to 6.50
No. 1 cast	10.00 to 10.50
Railroad grate bars	5.50 to 6.00
Stove plate	5.50 to 6.00
Rails under 3 ft.	8.50 to 9.00
Rails for rolling	8.00 to 8.50
Railroad malleable	10.00 to 10.50
Cast iron car wheels	11.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:	
No. 1 heavy melting steel	\$10.00 to \$10.50
No. 2 heavy melting steel	8.50 to 9.00
Scrap rails	7.00 to 7.50
New hydraulic, comp. sheets	8.50 to 9.00
Old hydraulic, comp. sheets	7.50 to 8.00
Drop force flashings	8.00 to 8.50
No. 1 busheling	8.50 to 9.00
Hvy. steel axle turnings	6.50 to 7.00
Machine shop turnings	5.00
Knuckles and couplers	9.00 to 9.50
Coil and leaf springs	9.00 to 9.50
Roller steel wheels	9.00 to 9.50
Low phos. billet crops	12.00 to 12.50
Short shov. steel turnings	6.50 to 7.00
Short mixed borings and	
turnings	4.50 to 5.00
Cast iron borings	3.75 to 4.25
No. 2 busheling	3.50 to 4.00
Steel car axles	10.00 to 11.00
Iron axles	10.00 to 11.00
No. 1 machinery cast	10.50 to 11.00
No. 1 cupola cast	9.00 to 9.50
Stove plate	7.50 to 8.00
Steel rails 3' to 12'	11.50 to 12.00
Cast iron car wheels	8.00 to 9.00
Industrial malleable	7.00 to 7.50
Railroad malleable	9.50 to 10.50
Chemical borings	7.50 to 8.00

BIRMINGHAM

Per gross ton delivered consumers' yards:	
Heavy melting steel	\$9.00 to \$9.50
Scrap steel rails	4.00
Short shoveling turnings	4.00
Stove plate	6.00
Steel axles	10.00
Iron axles	10.50
No. 1 railroad wrought	3.00
Rails for rolling	8.00 to 8.50
No. 1 cast	8.00 to 8.50
Tramcar wheels	8.00
Cast iron borings, chem.	8.00

ST. LOUIS

Per gross ton delivered consumers' yards:	
Selected heavy steel	\$8.00 to \$8.50
No. 1 heavy melting	8.00 to 8.50
No. 1 locomotive tire	7.50 to 8.00
Misc. stand-sec. rails	8.50 to 9.00
Railroad Springs	9.00 to 9.50
Bundled sheets	3.50 to 4.00
No. 2 railroad wrought	8.00 to 8.50
No. 1 busheling	3.50 to 4.00
Cast iron borings and	
shoveling turnings	2.50 to 3.00
Rails for rolling	9.50 to 10.00
Machine shop turnings	2.50 to 3.00
Heavy turnings	4.00 to 4.50
Steel car axles	9.50 to 10.00
Iron car axles	11.00
Wrot. iron bars and trans.	7.00 to 7.50
No. 1 railroad wrought	5.50 to 6.00
Steel rails less than 3 ft.	10.00 to 10.50
Cast angle bars	8.50 to 9.00
No. 1 machinery cast	7.00 to 7.50
Railroad malleable	7.50 to 8.00
No. 1 railroad cast	7.25 to 7.75
Stove plate	6.50 to 7.00
Relay rails, 60 lb. and	
under	16.00 to 16.50

Relay rails, 60 lb. and	
over	\$20.00 to \$21.00
Agricult. malleable	4.00 to 4.50

BOSTON

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$5.00 to \$5.25
Scrap T rails	4.75 to 5.00
Machine shop turnings	2.00 to 2.25
Cast iron borings	2.00 to 2.25
Bundled skeleton, long	3.00 to 3.25
Forge flashings	3.00 to 3.50
Blast furnace scrap	1.75 to 2.00
Shafting	7.50 to 8.00
Steel car axles	7.50 to 8.00
Wrought pipe	2.25 to 2.50
Rails for rolling	6.00 to 6.50
Cast iron borings, chemical	7.25 to 7.75
Per gross ton delivered consumers' yards:	
Textile cast	\$7.00 to \$7.50
No. 1 machinery cast	7.00 to 7.50
Stove plate	4.25 to 4.50
Railroad malleable	8.50 to 9.50

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$5.50 to \$6.00
No. 2 heavy melting steel	4.50 to 5.00
Heavy melting steel (yard)	2.50 to 3.00
No. 1 heavy breakable cast	5.00 to 5.50
Stove plate (steel work)	3.00 to 3.25
Machine shop turnings	2.50 to 3.00
Short shoveling turnings	2.50 to 3.00
Cast borings	2.50 to 3.00
No. 1 blast furnace	2.50 to 3.00
Steel car axles	9.50 to 10.00

Spec. iron and steel pipe	\$3.00 to \$3.25
Forge fire	2.75 to 3.00
No. 1 railroad wrought	5.00 to 5.50
No. 1 yard wrought long	3.50 to 3.75
Rails for rolling	5.50 to 6.00
No. 1 cast	5.50 to 5.75
No. 2 cast	4.50 to 4.75
Stove plate (foundry)	4.50 to 5.00
Cast borings (chemical)	6.00 to 6.50
Per gross ton, delivered local foundries:	
No. 1 machinery cast	\$9.00
No. 1 hvy. cast (cupola size)	7.50 to 8.00
No. 2 cast	5.00 to 5.50

CINCINNATI

Dealers' buying prices per gross ton:	
Heavy melting steel	\$7.25 to \$7.75
Scrap rails for melting	7.25 to 7.75
Loose sheet clippings	2.00 to 2.50
Bundled sheets	4.25 to 4.75
Cast iron borings	3.50 to 4.00
Machine shop turnings	3.25 to 3.75
No. 1 busheling	4.50 to 5.00
No. 2 busheling	2.75 to 3.25
Rails for rolling	7.75 to 8.25
No. 1 locomotive tires	7.25 to 7.75
Short rails	10.00 to 10.50
Cast iron car wheels	7.25 to 7.75
No. 1 machinery cast	6.75 to 7.25
No. 1 railroad cast	6.25 to 6.75
Burnt cast	4.50 to 5.00
Stove plate	4.50 to 5.00
Agricultural malleable	7.75 to 8.25
Railroad malleable	8.00 to 8.50

DETROIT

Dealers' buying prices per gross ton:	
Hvy. melting steel	\$7.25 to \$7.75
Borings and short turnings	5.50 to 6.00
Long turnings	4.50 to 5.00
No. 1 machinery cast	8.00 to 8.50
Automotive cast	10.00 to 10.50
Hydrcul. comp. sheets	7.25 to 7.75
Stove plate	4.00 to 4.50
New No. 1 busheling	8.00 to 8.50
Old No. 2 busheling	4.00 to 4.50
Sheet clippings	3.25 to 3.75
Flashings	5.00 to 5.50

CANADA

Dealers' buying prices per gross ton:	
	Toronto Montreal
Heavy melting steel	\$4.50 \$4.50
Rails, scrap	4.50 4.50
Machine shop turnings	2.00 2.00
Boiler plate	4.50 4.50
Heavy axle turnings	2.50 2.50
Cast borings	2.00 2.00
Steel borings	2.00 2.00
Wrought pipe	2.50 2.50
Steel axles	4.50 6.00
Axles, wrought iron	4.50 6.50
No. 1 machinery cast	7.75 9.00
Stove plate	4.50 5.00
Standard car wheels	7.25 7.00
Malleable	6.75 7.00

Warehouse Prices for Steel Products

PITTSBURGH

Base per Lb.	
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.60c.
Reinforcing steel bars	2.60c.
Cold-finished and screw stock	
Rounds and hexagons	2.95c.
Squares and flats	2.95c.
Hoops and bands, under 1/4 in.	2.95c.
Hot-rolled annealed sheets (No. 24)	3.10c.
25 or more bundles	3.10c.
Galv. sheets (No. 24), 25 or more bundles	3.60c.
Hot-rolled sheets (No. 10)	2.60c. to 2.90c.
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	\$3.61
Spikes	2.40c.
Small	2.65c.
Boat	2.90c.
Track bolts, all sizes, per 100 count	70 per cent off list.
Machine bolts, 100 count	70 per cent off list.
Carriage bolts, 100 count	70 per cent off list.
Nuts, all styles, 100 count	70 per cent off list.
Large rivets, base per 100 lb.	\$3.00
Wire, black, soft ann't'd, base per 100 lb.	2.65
Wire, galv. soft, base per 100 lb.	2.10
Common wire nails, per keg	2.20
Cement coated nails, per keg	2.20

CHICAGO

Base per Lb.	
Plates and structural shapes	3.00c.
Soft steel bars	2.75c.
Reinforc. bars, billet steel 1.55c. to 1.70c.	
Rail steel reinforcement	1.30c. to 1.45c.
Cold-fin. steel bars and shafting	
Rounds and hexagons	3.00c.
Flats and squares	3.50c.
Bands, 3/16 in. (in Nos. 10 and 12 ga.)	2.95c.
Hoops (No. 14 gage and lighter)	3.50c.
Hot-rolled annealed sheets (No. 24)	3.45c.
Galv. sheets (No. 24)	3.85c.
Hot-rolled sheets (No. 10)	2.75c.
Spikes (3/16 in. and lighter)	3.45c.
Track bolts	4.30c.
Rivets, structural (keg lots)	2.75c.
Rivets, boiler (keg lots)	2.75c.
Machine bolts	Per Cent Off List
Carriage bolts	65
Coach and lag screws	65
Hot-pressed nuts, sq., tap. or blank	65
Hot-pressed nuts, hex., tap. or blank	65
Hex. head cap screws	80 and 10
Flat point set screws	75
Washers	50 and 10
Spring cotters	60 and 10
Stove bolts	80
Rd. hd. tank rivets, 7/16 in. and smaller	85
Wrought washers	\$4.50 off list
No. 8 black ann't'd wire, per 100 lb.	\$3.45
Com. wire nails, base per keg	2.30
Cement c't'd nails, base per keg	2.30

NEW YORK

Base per lb.	
Plates and struc. shapes	3.10c.
Soft steel bars, small shapes	3.10c.
Iron bars	3.24c.
Iron bars, shed, charcoal	5.75c. to 6.25c.
Cold-fin. shafting and screw stock	
Rounds and hexagons	3.54c.
Flats and squares	4.04c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	5.30c.
Bands	3.30c.
Hot-rolled sheets (No. 10)	2.60c.
Hot-rolled ann't'd sheets (No. 24)	3.25c.
Galvanized sheets (No. 24)	3.50c.
Long term sheets (No. 24)	4.50c.
Standard tool steel	12.00c.
Wire, black annealed (No. 10)	3.60c.
Wire, galv. annealed (No. 10)	4.05c.
Tire steel 1/4 x 1/4 in. and larger	3.40c.
Smooth finish, 1 to 2 1/4 x 1/4 in. and larger	3.75c.

Open hearth spring steel, bases	4.50c. to 7.00c.
Common wire nails, base, per keg	\$2.65
Machine bolt, cut thread:	Off List
1/4 x 6 in. and smaller	65 to 65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Carriage bolts, cut thread:	
1/4 x 6 in. and smaller	65 to 65 and 10
1/2 x 20 in. and smaller	65 to 65 and 10
Boiler tubes:	Per 100 Ft.
Lap welded, 2-in.	\$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65
*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.	

ST. LOUIS

Base per Lb.	
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
Cold-fin. rounds, shafting, screw stock	3.36c.
Hot-rolled annealed sheets (No. 24)	3.60c.
Galv. sheets (No. 24)	4.00c.
Hot-rolled sheets (No. 10)	3.00c.
Black corrug. sheets (No. 24)	3.65c.
Galv. corrug. sheets	4.05c.
Structural rivets	3.00c.
Boiler rivets	3.00c.
Tank rivets, 7/16 in. and smaller	Per Cent Off List
100 lb.	70
Less than 100 lb.	70
Machine bolts	65
Carriage bolts	65
Lag screws	65
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	65
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	65
Less than 200 lb.	55

PHILADELPHIA

Base per Lb.	
*Plates, 1/4 in. and heavier	2.45c.
*Structural shapes	2.45c.
*Soft steel bars, small shapes, iron bars (except bands)	2.45c.
Reinforc. steel bars, sq., twisted and deformed	2.30c.
Cold-finished steel bars	3.35c.
*Steel hoops	3.00c.
*Steel bands, No. 12 to 3/16 in. incl.	2.75c.
Spring steel	3.00c.
*Hot-rolled annealed sheets (No. 24)	3.15c.
*Galvanized sheets (No. 24)	3.50c.
*Hot-rolled annealed sheets (No. 10)	2.70c.
Diam. pat. floor plates, 1/4 in.	5.00c.
Swedish iron bars	5.60c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.
*Base prices subject to deductions on orders aggregating 4000 lb. or over.
†For 50 bundles or over.

CLEVELAND

Base per Lb.	
Plates and struc. shapes	2.95c.
Soft steel bars	2.75c.
Reinforc. steel bars	1.75c. to 2.25c.
Flat rolled steel under 1/4 in.	2.95c.
Cold-finished strip	5.55c.
Hot-rolled annealed sheets (No. 24)	3.25c.
Galvanized sheets (No. 24)	3.50c.
Hot-rolled sheets (No. 10)	3.00c.
Black ann't'd wire, per 100 lb.	\$2.55
No. 9 galv. wire, per 100 lb.	2.90
Com. wire nails, base per keg	2.10

*Net base, including boring and cutting to length.

CINCINNATI

Base per Lb.	
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
New billet reforc. bars	3.00c.
Rail steel reforc. bars	3.00c.
Hoops	3.90c.
Bands	3.20c.
Cold-fin. rounds and hex.	3.32c.

Base per Lb.	
Squares and flats	3.82c.
Hot-rolled annealed sheets (No. 24)	3.75c.
Galv. sheets (No. 24)	3.55c.
Hot-rolled sheets (No. 10)	3.30c.
Structural rivets	4.20c.
Small rivets	60 per cent off list.
No. 9 ann't'd wire, per 100 lb.	\$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg	2.95
Chain, per 100 lb.	10.25
Seamless steel boiler tubes, 2-in.	\$15.87
4-in.	34.57
Lap-welded steel boiler tubes, 2-in.	15.12

PLANT EXPANSION AND EQUIPMENT BUYING

◀ NEW ENGLAND ▶

Berger Brothers Co., Derby Avenue, New Haven, Conn., manufacturer of surgical equipment and devices, has let general contract to Fusco & Amatrude, Amity Road, for five-story addition, 40 x 120 ft., including improvements in present factory. Cost over \$65,000 with equipment. Douglas Orr, New Haven, is architect.

Niles Co., Inc., Lowell, Mass., has been organized by Robert R. Duncan and Henry B. Hosmer, 84 State Street, Boston, to manufacture signaling equipment and devices.

Wallingford Steel Co., Valley Street, Wallingford, Conn., has let contract to Berlin Construction Co., Berlin, Conn., for one-story addition for pickling unit. Cost over \$25,000 with equipment.

Royal Typewriter Co., Hartford, Conn., is advancing production schedule with employment of about 2000 men. Output approximates double that of a year ago this time.

Cheslock Mfg. Co., Hartford, Conn., has been organized by T. W. and Sanford C. Chesick, Hartford, to manufacture locks and locking devices.

Algonquin Brewing Co., Inc., 224 Hallam Street, Bridgeport, Conn., has plans by Fletcher-Thompson, Inc., 1336 Fairfield Avenue, engineer, for extensions and improvements. Cost over \$100,000 with equipment.

◀ NORTH ATLANTIC ▶

Piel Brothers, 375 Liberty Avenue, Brooklyn, brewers, have plans for new four-story unit, including improvements in present building. Cost over \$600,000 with equipment.

Slide Fastener Corp., New York, has been organized, capital \$250,000, by F. Prescott Hammond, Jr., 600 West 115th Street, and Anton F. VonBernuth, 19-18 149th Street, Whitestone, L. I., to manufacture metal slide fastening devices and kindred metal goods.

Greenpoint Trading Corp., 166 North Fourth Street, Brooklyn, machinery and parts, has plans for one-story top addition to factory. Cost about \$25,000 with equipment. Benjamin Chester, 26 Court Street, is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 6 for 3000 steel shears (Schedule 156), 150 revolving stools (Schedule 158) for Brooklyn Navy Yard.

Airkure Corp. of America, Inc., New York, has been organized by Isidore Strauss, 3108 Ripple Street, Brighton Beach, L. I., and John J. Mercer, 105 West 103rd Street, New York, to manufacture special generators and parts, air-conditioning equipment, etc.

Schock, Gusmer & Co., Inc., 857 Tenth Avenue, New York, manufacturer of brewing machinery and parts, has let general contract to Marshall Construction Co., 250 West Fifty-seventh Street, for extensions and improvements in former one- and four-story and basement factory of Federal Metal Bed Co., Hoboken, N. J., recently acquired for new plant. About 85,000 sq. ft. space will be provided. Cost over \$70,000 with equipment. Otto S. Schlich, 136 Liberty Street, New York, is architect.

Trojan Metal Works, New York, recently organized, has leased space in building at 109-123 West Sixty-fourth Street, for new plant.

Lisov Auto Body Co., 80 Maple Avenue, Montclair, N. J., manufacturer of commercial automobile bodies, has plans for one-story and basement addition. Cost over \$25,000 with equipment. Edwin P. Bonnet, 363 Bloomfield Avenue, is architect.

Esterbrook Steel Pen Mfg. Co., Delaware Avenue and Cooper Street, Camden, N. J., is planning early removal of branch plant from Hanover, Pa., to Camden works, where production will be concentrated and expanded.

Birenbaum Metal Co., Newark, N. J., care of I. Arthur Levy, Lefcourt Building, representative, has been organized, capital \$100,000, by Samuel E. Cooper and associates, to manufacture metals and metal products.

Bamberger Broadcasting Co., 147 Market Street, Newark, N. J., has engaged Voorhees,

Gmelin & Walker, 101 Park Avenue, New York, architects, to draw plans for high-power broadcasting plant on 20-acre tract in Riverside Park district, East Rahway, N. J., recently acquired, with main unit, 80 x 80 ft. Cost over \$200,000 with steel towers, power station and other structures.

John A. Cozzone & Co., 20 Kent Street, Newark, manufacturer of metal goods, automobile parts, etc., has adopted capacity full-time schedule, recalling all former workers.

Owen Osborne, Inc., 401 West Somerset Street, Philadelphia, has let general contract to A. K. Adams & Co., Atlanta, Ga., for new one-story knitting mill at Gainesville, Ga. Cost about \$40,000 with machinery.

Department of Supplies and Purchases, City Hall Annex, Philadelphia, Joseph H. Hagedorn, director, asks bids until June 6 for bolts and nuts (Class J), hardware (Class H), pipe and fittings (Class N), chemical and suction hose and couplings (Class 216).

Esslinger's, Inc., 417 North Tenth Street, Philadelphia, brewer, has filed plans for addition to works. Cost close to \$30,000 with equipment.

Finch Mfg. Co., Eighth Avenue and West Linden Street, Scranton, Pa., manufacturer of engines, presses, hoists, parts, etc., plans rebuilding part of plate shop and foundry, recently destroyed by fire. Loss about \$100,000 with equipment.

Board of Public Education, Administration Building, Philadelphia, asks bids until June 6 for boilers and accessories, and other equipment for school at Longshore and Dilman Streets. Edward Merchant is secretary and business manager.

Barnmaid Beverage Co., Philadelphia, recently organized, has leased three-story factory at 3108-12 Germantown Avenue, for new brewing and bottling plant.

Supervising Architect, Treasury Department, Washington, asks bids until June 20 for brass water piping, valves, etc., for post office at Lockport, N. Y.

George Zett Brewing Co., Syracuse, N. Y., has been acquired by new interests headed by Louis A. Wehle, president, Wehle Baking Co., 174 Clarissa Street, and Genesee Brewing Co., both Rochester. New owner plans extensions and improvements, including brew-house, bottling and other equipment. Cost about \$75,000 with machinery.

Brooks Steam Motors, Inc., 618 Northumberland Avenue, Buffalo, manufacturer of steam buses, parts, etc., in receivership, has been purchased by Alfred H. Sharpe, 94 St. James Place, and associates, who plan operation.

◀ SOUTH ATLANTIC ▶

American Brewery, Inc., 1700 North Gay Street, Baltimore, has let general contract to Frainie Brothers, 19 West Franklin Street, for one-story addition, including improvements in present plant. Cost over \$50,000 with equipment.

Quartermaster, Fort Myer, Va., asks bids until June 5 for new water pumping plant with automatic-controlled pumping machinery and accessories (Circular 17).

Board of Trustees, Emory University Hospital, Atlanta, Ga., plans rebuilding of steam power house and machine shop recently destroyed by fire. Loss about \$50,000 with equipment.

Jacksonville Brewing Co., Jacksonville, Fla., William Ostner, president, has approved plans for extensions and improvements, including new one-story mechanical bottling works. Cost about \$55,000 with machinery.

Construction Service, Veterans' Administration, Washington, asks bids until June 13 for wrought iron fencing and gates, and chain link fencing and gates for institution at Columbia, S. C.

Southern Breweries, Inc., Charlotte, N. C., recently organized by W. E. Love, Burlington, N. C., and associates, capital \$350,000, has acquired property in first noted city for new plant, and plans erection of two units. Cost over \$85,000 with equipment.

Southeastern Compress Co., Columbus, Ga., plans rebuilding cotton compress plant damaged by fire May 20. Loss over \$300,000 with machinery.

Town Council, Culpepper, Va., has engaged Wiley & Wilson, American National Bank Building, Richmond, Va., consulting engineers, to make plans and surveys for municipal electric light and power plant. Fund of \$120,000 has been approved.

General Purchasing Officer, Panama Canal, Washington, asks bids until June 6 for iron and brass valves, expansion joints, hydraulic gages, slotted strainers, pipe fittings, hydraulic fittings, copper gaskets, wrought iron pipe, etc., for Madden dam (Schedule 2870), until June 9, galvanized iron conduit bends, conduit couplings, galvanized pipe, three gate valves, floor drain, etc. (Schedule 2873).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 6 for files (Schedule 118), eight electric-driven winches and spare parts (Schedule 137), file and tool handles and hammer handles (Schedule 121), abrasive wheels (Schedule 145), steel sheets, plates, bars and shapes (Schedule 155), axes, hatchets, sledges and hammers (Schedule 122), 6000 lb. brass pipe (Schedule 151), all for Eastern and Western yards; 9228 lb. copper nickel alloy forgings, 5270 lb. copper plunger forgings, and 90,600 lb. counter recoil cylinder forgings (Schedule 163), for Washington yard; metallic ladder treads (Schedule 127) for Brooklyn, Mare Island and San Diego yards; 1104 steam and water valves, 16 air or steam valves (Schedule 154) for San Diego yard.

◀ CENTRAL DISTRICT ▶

Borough Council, Homestead, Pa., asks bids until June 5 for electric pumping machinery, valves, piping and other equipment for new well-water system, capacity 1,500,000 gal. a day.

Pennsylvania Rubber Co., Jeannette, Pa., manufacturer of automobile tires and tubes, has developed peak production on 24-hr. day basis, seven-day week, with working quota of 1000 persons. May marked largest production in history of company for monthly period.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has established a 100 per cent production schedule at electric refrigerator manufacturing plants, giving employment to about 2500 operatives.

Cleveland & Sandusky Brewing Co., 2600 Carroll Avenue, Cleveland, H. C. Lang, president, has plans for extensions and improvements in branch plant at Sandusky, Ohio, including additional equipment. Cost over \$60,000 with machinery. E. A. Broberg, 2014 West Fifty-third Street, Cleveland, is architect.

Seibold Products Co., New Philadelphia, Ohio, Henry Seibold, president, plans extensions and improvements in brewery, including additional equipment. Cost over \$50,000 with machinery.

Payne Plumbing Fixtures Co., Cincinnati, care of Edward D. Woodward, 414 Walnut Street, representative, has been organized, capital \$200,000, by Thomas F. and Frank P. Payne, Cincinnati, to manufacture plumbing equipment and supplies.

City Council, City Hall, Cincinnati, C. A. Dykstra, city manager, is considering installation of a municipal electric light distributing system in different districts. Cost over \$500,000 with equipment. Fosdick & Hilmer, Union Trust Building, are consulting engineers.

Libbey-Owens-Ford Glass Co., Nicholas Building, Toledo, Ohio, manufacturer of sheet glass products, has increased production at different plants, advancing working force to 3135, largest number in history of company.

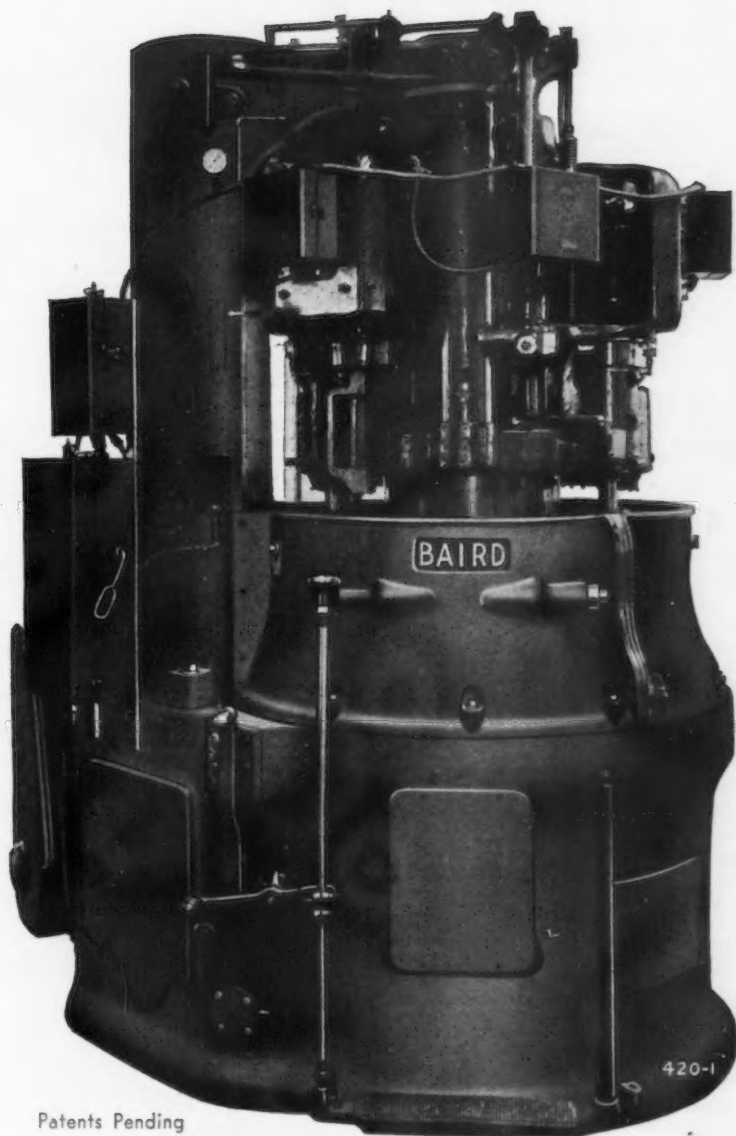
Lubeck Brewing Co., Toledo, Ohio, recently organized, has acquired plant of Woolner Malt & Beverage Co., 26 South Superior Street, and plans expansion and improvements, including brew-house, bottling and other machinery. Cost about \$100,000 with equipment.

Common Council, Woodsfield, Ohio, plans extensions and improvements in municipal electric light and power plant, with installation of new Diesel engine unit and auxiliary equipment.

Lackner Co., 21 West Pearl Street, Cincinnati, manufacturer of signs and displays, is arranging for new two-story and basement plant, to be owned by Acme Realty Co., Carew



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At each station the dressing of the wheel; the wheel speed and feed; size of hole, etc., are independent of any other station. This results in the utmost simplicity and flexibility of operation.

Two different diameters of holes may be ground in the same pass through the machine. Double indexing may be used to grind different holes in both ends of a piece of work. This is a feature exclusively BAIRD.

This grinder is built by a company possessing over 60 years of experience in building cost-reducing machine tools, and during that time over 57 different types of machines have been built to meet the needs of Baird customers.

Submit your grinding jobs for an estimate.

THE BAIRD MACHINE COMPANY

BRIDGEPORT, CONN.

Tower, and occupied under lease. Cost about \$25,000 with equipment. George H. Lackner is president.

Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until June 5 for 500 gun trunnion bolt and bracket assemblies, 800 gun-mounting post assemblies and 500 solenoid assemblies (Circular 646), cylindrical plug gages, single end (Circular 639), 1000 clock assemblies (Circular 632), 1125 propeller hub rear cone spacers, 1175 propeller hub retaining nuts, 1175 propeller hub front cones, 50 propeller hub snap rings (Circular 642); until June 6, exhaust collector rings in lots of 200 to 300 (Circular 634); until June 7, 258 propeller blades (Circular 630), six tool room precision lathes (Circular 649), 228 flotation cylinders, 120 sets flotation gear inflation equipments, etc. (Circular 635); until June 12, 120 40-in. streamline wheel assemblies and 120 brake assemblies (Circular 645), 100,000 spark plugs and 190 gap setting tools (Circular 643).

Common Council, Grandview Heights, Ohio, plans installation of electric pumping machinery and other equipment, pipe lines, etc., for new municipal waterworks. Cost about \$55,000. C. A. Niple, 1016 Grandview Avenue, is consulting engineer.

Weil Packing Co., 1700 Oakley Street, Evansville, Ind., meat packer, has plans for one-story addition. Cost about \$45,000 with equipment. H. Peter Henschien, 59 East Van Buren Street, Chicago, is architect and engineer.

Hydraulic Stokers, Inc., Indianapolis, has been organized by Harry F. Bennett and Louis Schwitzer, 4401 Washington Boulevard, to manufacture stokers and kindred equipment.

Kalamazoo Vegetable Parchment Co., Parchment, Kalamazoo, Mich., has plans for two one-story additions to paper mill. Cost over \$50,000 with equipment. Bingham & Cobb, Kalamazoo, are architects.

West Michigan Dock & Market Corp., Muskegon, Mich., Max B. McKee, president, recently organized to take over properties of Muskegon Dock & Fuel Co., and Goodrich Transit Co., comprising 54-acre lake front tract, has plans for new port terminal, including five-story cold storage and refrigerating plant, 80 x 80 ft., power station, machine shop, seaplane base, dock with water frontage of four city blocks, and other structures. Complete mechanical-handling equipment will be installed, cranes, loaders, etc. Cost over \$650,000 with equipment. Stahl & Co., McKerchey Building, Detroit, are architects.

McInerney Spring & Wire Co., Grand Rapids, Mich., has been organized by James L. McInerney, 55 Cottage Grove Street, S.W., and associates, capital \$200,000, to manufacture wire goods, steel springs and kindred products.

Mueller Brass Co., Port Huron, Mich., has increased production schedule, recalling about 175 men, making total working quota of about 600 on full time basis.

◀ MIDDLE WEST ▶

Bosworth Products Co., 2336 Bosworth Avenue, Chicago, let general contract to A. Marcus, 228 North LaSalle Street, for two-story brewing plant. Cost over \$75,000 with equipment.

Capitol Breweries, Inc., Chicago, E. C. Kramp, president, care of Richard C. Day, 10 South LaSalle Street, representative, has asked bids on general contract for extensions and improvements in property recently acquired at Hartland, Ill., for new plant. Cost \$100,000 with equipment.

Robert Gair Co., Quincy, Ill., manufacturer of corrugated boxes and containers, is discontinuing operations at local plant and will transfer production to mill at Piedmont, N. Y., where expansion will be carried out. Headquarters are at 420 Lexington Avenue, New York.

Weaver Engineering Co., 2171 South Ninth Street, Springfield, Ill., has been organized, capital \$100,000, by I. A. Weaver and Charles T. Mackness, Springfield, to manufacture machinery and parts, tools, etc.

Common Council, Thief River Falls, Minn., is considering improvements in municipal electric light and power plant, including installation of 1000-hp. Diesel engine unit and accessory equipment. P. A. Pederson is city clerk.

Minnesota Oil & Refining Co., Pence Building, Minneapolis, is considering new bulk oil storage and distributing plant, 96 x 120 ft., with steel tanks and other equipment. Cost about \$30,000 with equipment.

Common Council, Wellman, Iowa, plans erection of a municipal electric light and

power plant. Cost over \$80,000 with equipment. H. L. Cory Co., Redick Tower Building, Omaha, Neb., is consulting engineer.

Midwest Motor Products Co., Inc., Minneapolis, has been organized, capital \$50,000, by Fred R. Warner and Clarence N. Kallberg, 2631 St. James Avenue North, to manufacture automobile parts and equipment.

Seeger Refrigerator Co., Arcade Avenue and Wells Street, St. Paul, Minn., manufacturer of refrigerators, parts, etc., has adopted 24-hr. day production basis, reinstating about 350 men, making a total of 700 men at plant.

Jung Products Co., Round Lake, Ill., has approved plans for improvements and modernization of brewery, including additional equipment. Cost about \$50,000 with machinery.

Chicago, Burlington & Quincy Railroad Co., 547 West Jackson Boulevard, Chicago, has approved plans for new tie-treating plant at Sheridan, Wyo., with installation of creosote tanks, spraying equipment, mechanical-handling equipment, etc. Total cost about \$75,000. A. W. Newton is chief engineer.

A. O. Smith Corp., Milwaukee, has experienced so great a demand for steel beer barrels that it is preparing to install three additional production lines, increasing daily output from 2000 to about 7500 barrels.

Joy Rider Co., 3200 West Villard Avenue, Milwaukee, has been organized by Andrew A. Asikainen to manufacture new types of metal playground equipment. Manufacturing will be conducted at plant of Lakeside Bridge & Steel Co. for present.

Steel Container Corp., Sheboygan, Wis., has been incorporated to manufacture metal containers, principally beer cases. Principals are W. E. Jung, Edward A. Juul and J. H. Carter. Production arrangements are under way.

Two Rivers, Wis., city commission has commissioned Jerry Donohue Engineering Co., Sheboygan, Wis., to make survey and prepare plans for \$100,000 municipal filtration plant. E. J. Donnelley is city manager.

Green Bay, Wis., Metropolitan Sewerage Commission, will proceed at once with construction of sewer system and sewage disposal plant to cost \$621,000, designed by Jerry Donohue Engineering Co., Sheboygan, Wis., with Alvord, Burdick & Howson, 20 North Wacker Drive, Chicago, as associate engineers. J. H. Servotte, 915 Doty Street, Green Bay, is secretary of commission.

◀ SOUTHWEST ▶

Livers Lighting & Bronze Co., Kansas City, Mo., has been organized by John F. Livers, 5912 Central Street, and associates, to manufacture lighting fixtures and kindred equipment.

St. Louis-San Francisco Railroad Co., Frisco Building, St. Louis, has plans for rebuilding engine house and repair shops at Oklahoma City, Okla., recently damaged by fire. Cost about \$150,000 with equipment.

State Construction Commission, Capitol Building, Little Rock, Ark., asks bids until June 8 for water and steam pipe line supply systems, power house equipment, etc., for farm colony at State Hospital, Benton, Ark. Mann, Wanger & King, Donaghey Building, Little Rock, are architects.

Falstaff Brewing Corp., 3684 Forest Park Boulevard, St. Louis, has leased plant of Stifel's Union Brewing Co., Gravois Avenue, for branch plant. Improvements will be made. Falstaff company recently let contract for two-story and basement addition to main plant, in connection with expansion program to cost about \$300,000.

Common Council, Checotah, Okla., plans installation of pumping machinery and accessory equipment, pipe lines, etc., for municipal waterworks. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is consulting engineer.

City Council, Wichita Falls, Tex., V. R. Smitham, city manager, has revised plans for municipal electric light and power plant and distributing system. Cost about \$100,000 with equipment. Montgomery & Ward, Harvey-Snyder Building, are consulting engineers.

Port Commission, Houston, Tex., Russell Waite, director, plans early call for bids for heavy-lift steel derrick at dock property of Harris County Navigation District.

Houston American Brewing Co., 1 Main Street, Houston, Tex., R. D. Frazier, head, plans new works with capacity of about 150 bbl. a day, and will soon purchase tanks, kettles, brewhouse machinery, bottling equipment, conveyors, etc.

◀ SOUTH CENTRAL ▶

Security Brewing Co., 901 Tchoupitoulas Street, New Orleans, Samuel Meyer, president, plans extensions and improvements in three-story plant at Algiers, La., including erection of new unit. Cost over \$150,000 with equipment.

Swift & Co., Union Stock Yards, Chicago, is considering new meat-packing plant in connection with live stock and concentration plant on 10-acre tract at Lexington, Ky. Cost over \$50,000 with equipment.

Lannon Mfg. Co., Tullahoma, Tenn., manufacturer of baseball bats and other turned hardwood products, has let general contract to Foster & Creighton, American Bank Building, Nashville, Tenn., for three-story addition, 68 x 85 ft. Cost about \$40,000 with equipment. Asmus & Clark, Nashville Trust Building, Nashville, are architects. Headquarters are at Grinnell, Iowa.

Standard Oil Co., Louisville, plans rebuilding part of bulk oil storage and distributing plant at Richmond, Ky., recently damaged by fire. Loss about \$27,000 with equipment.

Humko Lard Co., Thomas Street, Memphis, Tenn., manufacturer of lard products from vegetable oils, has approved plans for addition to North Memphis plant for production of hydrogen gas for operating service. Cost about \$65,000 with equipment. W. F. H. Schultz is plant engineer.

American Brewery Co., 730 Bienville Street, New Orleans, has let general contract to Reimann Construction Co., Maritime Building, for extensions and improvements in four-story plant. Cost about \$60,000 with equipment. Samuel Stone, Jr., & Co., Masonic Temple Building, are architects.

◀ PACIFIC COAST ▶

Orange County Brewing Co., Anaheim, Cal., recently organized, A. L. Harlow, Valencia Hotel, representative, has acquired former local Anaheim Brewery. Plans are being drawn for extensions and improvements. Cost about \$150,000, of which \$100,000 will be expended for equipment. Lionel Linek, Fifty-second Street and Santa Fe Avenue, Vernon, Cal., is engineer.

City Council, Los Banos, Cal., is considering erection of municipal electric light and power plant, using Diesel engine-generating units. Cost over \$70,000 with equipment.

Director of Business Control, Olaf Olson, Capitol Building, Olympia, Wash., has plans for new power plant at State prison, Walla Walla, Wash. Cost over \$45,000 with equipment. George M. Rasque, Spokane Savings Bank Building, Spokane, Wash., is architect.

Fairbanks School District, Fairbanks, Alaska, will install manual training equipment in new three-story and basement school. Cost about \$150,000. Tourtellotte & Hummel, Postal Building, Portland, are architects.

Shell Oil Co., Shell Building, San Francisco, has asked bids on general contract for rebuilding part of oil refinery at Martinez, Cal., including bleaching unit, recently destroyed by fire. Cost close to \$100,000 with equipment.

Kitsap Brewing Association, Port Orchard, Wash., recently organized by Harry Matson, Port Orchard, and associates, capital \$250,000, plans new brewery in vicinity of city. Cost over \$125,000 with equipment. Mr. Matson will be president.

Los Angeles Brewing Co., 1920 North Main Street, Los Angeles, has plans for one-story addition, 48 x 133 ft., to be used in part for storage and distribution. Cost over \$50,000 with equipment. L. A. Parker, Architects' Building, is architect.

San Bernardino Brewing Co., Foothill Boulevard, San Bernardino, Cal., will erect a three-story brewery to cost \$200,000 with equipment.

◀ FOREIGN ▶

Ministry of Commerce, Government of Turkey, Istanbul, Turkey, is planning three large textile mills for manufacture of different specialties, each with power house, machine shop and other mechanical departments. Cost over \$600,000 with machinery.

British Sidac, Ltd., London, England, operating British Cellophane Co., Ltd., manufacturer of cellulose transparent wrapping materials, will carry out expansion and improvement program at former mill of Nuova Artificial Silk Co., St. Helens, Lancashire, recently acquired. New machinery will be installed during summer. Cost over \$350,000 with equipment.

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1/2" TO 24" WIDE—FOR ALL PURPOSES

Our 34 years of specialization in the rolling of hot and cold strip steel qualifies us to give intelligent and satisfactory service to both large and small users.

Capacity—250,000 tons per annum

We also roll and sell ALLEGHENY Stainless, all grades in strip form.

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WAREHOUSE STOCKS of Cold Rolled Strip Steels are carried by
EDGCOMB STEEL CO., Philadelphia—EDGCOMB STEEL CO., Newark

JOS. T. RYERSON & SON, Chicago



SAVE WITH STEEL

Iron and Steel Exports Again Show Increase

Exports of Iron and Steel from the United States
(In Gross Tons)

	April		Four Months Ended April	
	1933	1932	1933	1932
Pig iron.....	339	221	1,007	1,098
Ferromanganese.....		8		13
Scrap.....	73,719	19,047	201,195	48,758
<i>Pig iron, ferroalloys and scrap.....</i>	<i>74,058</i>	<i>19,276</i>	<i>202,202</i>	<i>49,869</i>
Ingots, blooms, billets, sheet bar.....	245	107	494	476
Skelp.....	512	954	990	6,776
Wire rods.....	1,488	1,178	4,382	7,487
<i>Semi-finished steel.....</i>	<i>2,245</i>	<i>2,239</i>	<i>5,866</i>	<i>14,739</i>
Steel bars.....	1,593	1,846	5,291	6,611
Alloy steel bars.....	105	76	345	673
Iron bars.....	36	43	129	154
Plates, iron and steel.....	234	1,737	1,311	5,213
Sheets, galvanized steel.....	2,178	2,694	8,732	10,326
Sheets, galvanized iron.....	40	141	142	547
Sheets, black steel.....	1,572	4,540	8,367	13,466
Sheets, black iron.....	132	501	534	1,242
Hoops, bands, strip steel.....	1,102	1,743	4,754	8,073
Tin plate;terne plate.....	3,501	4,460	14,233	14,483
Structural shapes, plain material.....	680	1,723	2,289	5,901
Structural material, fabricated.....	1,247	1,308	3,619	4,915
Tanks, steel.....	104	246	720	1,175
Steel rails.....	2,032	1,216	5,215	5,096
Rail fastenings, switches, frogs, etc.....	191	197	817	1,806
Boiler tubes.....	290	213	1,411	938
Casing and oil-line pipe.....	3,163	764	9,278	4,532
Pipe, black and galvanized, welded steel.....	1,436	2,663	6,519	9,509
Pipe, black and galvanized, welded iron.....	98	1,064	385	1,624
Plain wire.....	567	1,124	2,028	4,264
Barbed wire and woven wire fencing.....	1,111	2,293	5,469	7,522
Wire cloth and screening.....	42	68	183	210
Wire rope.....	141	144	565	634
Wire nails.....	431	781	1,993	3,074
Other nails and tacks.....	221	387	1,075	1,392
Horseshoes.....	23	1	30	28
Bolts, nuts, rivets and washers, except track... <i>Rolled and finished steel.....</i>	282 22,552	224 32,202	1,020 86,454	978 114,386
Cast iron pipe and fittings.....	421	3,010	1,769	4,307
Malleable iron screwed fittings.....	127	139	578	543
Car wheels and axles.....	228	306	1,684	1,171
Iron castings.....	94	235	810	657
Steel castings.....	28	111	223	473
Forgings.....	283	297	959	1,665
<i>Castings and forgings.....</i>	<i>1,181</i>	<i>4,098</i>	<i>6,023</i>	<i>8,816</i>
All other.....	359	271	1,073	1,354
Total.....	100,395	58,086	301,618	189,164

Imports of Iron and Steel Products into the United States
(In Gross Tons)

	April		Four Months Ended April	
	1933	1932	1933	1932
Pig iron.....	17,875	9,848	42,049	43,780
Sponge iron.....	10	...	63	51
Ferromanganese and spiegeleisen*.....	2,223	2,106	8,725	7,900
Ferrosilicon†.....	16	49	21	79
Ferrosilicon‡.....	...	...	4	20
Other ferroalloys.....	...	289	1	539
Scrap.....	149	532	1,056	2,008
<i>Pig iron, ferroalloys and scrap.....</i>	<i>20,273</i>	<i>12,824</i>	<i>51,919</i>	<i>54,377</i>
Steel ingots, blooms, billets, etc.....	21	88	92	1,983
Wire rods.....	542	276	3,673	3,078
<i>Semi-finished steel.....</i>	<i>563</i>	<i>364</i>	<i>3,765</i>	<i>5,061</i>
Concrete reinforcing bars.....	150	2,650	901	11,452
Hollow steel bars.....	94	93	326	275
Merchant steel bars.....	951	3,316	5,933	13,857
Iron bars.....	18	76	72	234
Iron slabs.....	...	...	1	...
Boiler and other plate.....	16	51	82	86
Sheets, skelp and saw plate.....	812	2,820	4,133	7,381
Tin plate.....	35	4,151	161	6,756
Structural shapes.....	1,920	3,154	7,358	12,390
Sheet piling.....	94	...	94	...
Rails and rail fastenings.....	63	685	394	1,160
Welded pipe.....	111	578	1,179	1,748
Other pipe.....	159	200	424	1,035
Barbed wire.....	456	1,390	4,072	5,666
Round iron and steel wire.....	244	223	992	813
Flat wire and strip steel.....	46	84	242	282
Wire rope and strand.....	145	202	525	616
Other wire.....	261	112	665	292
Hoops and bands.....	1,031	1,889	5,304	7,273
Nails, tacks and staples.....	323	995	2,508	3,522
Bolts, nuts and rivets.....	37	11	89	55
Other finished steel.....	22	2	133	27
<i>Rolled and finished steel.....</i>	<i>6,988</i>	<i>22,682</i>	<i>35,588</i>	<i>74,920</i>
Cast iron pipe and fittings.....	164	12	228	23
Castings and forgings.....	73	53	315	376
Total.....	28,061	35,935	91,815	134,757

*Manganese content only.

†Chromium content only.

‡Silicon content only.

WASHINGTON, May 26.—With the scrap movement totaling 73,709 gross tons, or slightly more than 73 per cent of the aggregate, exports of iron and steel products in April of the present year amounted to 100,395 tons, the highest for any month since April, 1931, when outgoing shipments were 101,434 tons. The April total exceeded that of March by 19,828 tons. In the first four months of the current year exports totaled 301,618 tons, of which 66 per cent or 201,195 tons was scrap, comparing with 189,164 tons, of which 26 per cent or 48,758 tons was scrap, exported in the corresponding period of 1932.

Imports in April rose to 28,061 tons from 22,114 tons in March. Imports in the first four months of 1933 were 91,815 tons against 134,757 tons in the corresponding period of 1932. Of the imports in April, 17,875 tons, or 63 per cent, consisted of pig iron. Imports of pig iron in the first four months of the present year, amounting to 42,049 tons, represented 45 per cent of the total incoming shipments. In the corresponding period of last year imports of pig iron amounted to 43,780 tons or 32.5 per cent of the total receipts.

Scrap exports in April, in tons, were distributed as follows: Japan, 48,253; Germany, 12,104; Italy, 7765; Poland, 4092; scattering, 1505.

The largest shipment of finished lines exported in April was 3501 tons of tin plate, of which 1049 tons went to Hong Kong; 814 tons to China; 680 tons to the Philippine Islands and 360 tons to Japan. Of the 3021 tons of

Sources of American Imports of Iron Ore

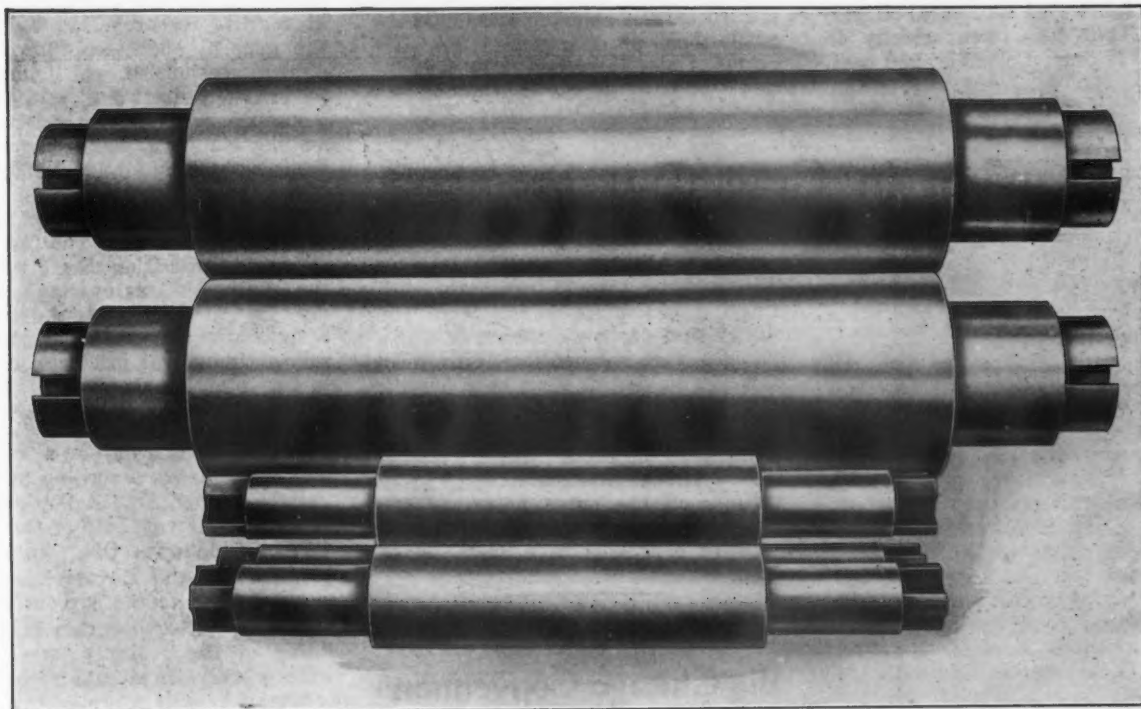
	April		Four Months Ended April	
	1933	1932	1933	1932
Chile.....	21,652	...	131,884	...
Cuba.....	22,000	22,150	55,000	...
Spain.....	...	...	49	...
Sweden.....	7,037	...	7,037	...
French Africa.....	6,375	...	6,375	...
Canada.....	80	...	298	...
Russia.....	8,000	32,710	31,000	65,710
Other countries.....	*6,762	599	21,953	35,729
Total.....	14,762	90,458	75,103	302,082

*Imported from Norway.

United States Imports of Pig Iron

	April		Four Months Ended April	
	1933	1932	1933	1932
India.....	10,803	5,564	20,431	15,372
United Kingdom.....	800	3,900	950	4,600
Germany.....	...	...	134	135
France.....	...	...	...	...
Netherlands.....	5,707	50	15,634	22,500
Sweden.....	...	156	2,803	254
Norway.....	...	...	...	...
Canada.....	...	28	419	138
Belgium.....	...	...	...	200
All others.....	565	150	1,628	581
Total.....	17,875	9,848	42,049	43,780

"NATIONAL" ROLL



CHILLED ROLLS FROM 10" TO 36" DIAMETER

ROLLING MILL MACHINERY

SPECIAL CHILLED ROLLS SAND ROLLS **ROLLS** PLAIN CHILLED ROLLS COLD ROLLS

EXTRA HARD ROLLS FOR BRASS, COPPER, ALUMINUM, ZINC

SPECIAL CONTACT ROLLS FOR FOUR-HIGH MILLS

The National Roll & Foundry Company

Office and Works: AVONMORE, PA., U. S. A.

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Iron

Months
April
1932
15,372
4,600
135
22,500
254
138
200
581
43,780

seamless casing and oil line pipe exported in April, 1172 tons went to Argentina; 928 tons to Japan and 419 tons to Venezuela. The Philippine Islands took 1213 tons of the 2178 tons of galvanized steel sheets exported, while Canada took 710 tons of the 1572 tons of black steel sheets exported. The Philippine Islands took 627 tons, Colombia, 594 tons and Canada, 434 tons of the 2032 tons of heavy steel rails shipped out of the country. Of the 1488 tons of wire rods exported, 1425 tons went to Japan. Canada took 830 tons of the 1593 tons of steel bars exported. Exports of fabricated structural shapes, totaling 1173 tons, went chiefly to Mexico, 329 tons; Colombia, 280 tons.

India supplied 10,803 tons of the pig iron imported in April and out of the total pig iron imports of 42,049 tons in the first four months of the current year, 20,431 tons or 48.5 per cent came from that country. Imports of Indian iron received at Philadelphia in the first four months aggregated 17,697 tons, or 86 per cent of the total shipments from India. Imports of ferromanganese and spiegel-eisen in April totaled 2223 tons, of which 1905 tons came from Canada; 130 tons from Norway and 100 tons from the United Kingdom. Belgium supplied 1618 tons of the 1920 tons of structural shapes imported. Of the 2229 tons of manganese ore imported, Cuba furnished 2226 tons.

sales work. Bennett Chapple, vice-president, American Rolling Mill Co., in an address, "What I Have Learned About Advertising During the Depression," will present practical suggestions relating to present day sales operations. William L. Rickard, president of Rickard & Co., will present the viewpoints of the oldest, and one of the largest, industrial advertising agencies, on the problem of marketing industrial products. Arthur C. Nielsen, president of A. C. Nielsen Co., who has completed many market surveys, will present an illustrated discussion of the principal features of market research. In addition to the general addresses there will be clinical sessions at which publication advertising, direct mail, house organs, visual presentations for salesmen, and similar subjects, will be analyzed from a practical standpoint by means of specimen material.

The sessions will be held during Engineering Week of the Century of Progress Exposition. Some twenty of the national engineering societies meet in Chicago during the week and design production, advertising and sale of industrial products will come in for intensive study.

A large waste of power occurs at electrode clamps, according to investigations of Bruce L. Bailey and Raymond R. Ridgway, both of the Norton Co., at Chippawa, Ont. In a paper presented to the Electrochemical Society, devoted to the current capacity of furnace electrodes, they suggest the lining of the ordinary steel clamp with bronze. In a case reported the conductivity was improved by a factor of five, owing probably to the fact that the bronze surface was fresh and polished while the steel surface had become pitted from service. They urge a clamp designed to yield to the slight irregularities of the electrode so that a better contact will result. The loss in power is concealed by the fact that the contact is water cooled.

Titanium in Gray Cast Iron

(Concluded from page 859)

ability tests, and gave results as follows:

Ferrotitanium added, per cent	0	1	2
Shaper test, 0.01 in. depth....	54.5	56.6	52.0
Shaper test, 0.02 in. depth....	87.0	91.0	84.5
Lathe test, 0.00313 in. feed....	28.0	29.5	26.0
Lathe test, 0.00694 in. feed....	39.0	41.0	37.5
Check lathe test, 0.00313 in. feed	24.0	26.0	21.5
Check lathe test, 0.00694 in. feed	37.0	39.0	34.5
Drill test, torque.....	16.5	18.0	16.5
Drill test, thrust.....	810	840	800

These values seem very consistent in showing the iron treated with 1 per cent ferrotitanium to be harder to machine than the untreated, but the iron treated with 2 per cent to be easier. These relations are in line with the graphite contents, as shown in Table II, but not in line with the hardness or strength tests, for the iron treated with 2 per cent ferrotitanium was harder and stronger than the untreated, and yet easier to machine, at least in the lathe and shaper tests.

No samples of plain untreated iron were included in Test D, which was made to see if 0.5 per cent of ferrotitanium would be enough, and how

this addition would compare with nickel in chromium-bearing iron. The silicon and carbon contents of these samples were not sufficiently uniform however to permit good comparisons of the effects of the alloys, and some of the titanium-treated test bars were unsound at the center, which explains the low tensile strength obtained after turning off the outer halves of the castings.

To be concluded in a forthcoming issue.

Industrial Advertisers Plan Big Chicago Convention

THE eleventh annual convention of the National Industrial Advertisers' Association will be held at Chicago June 26 to 28. It will include an extensive exhibit of successful industrial advertising on many products.

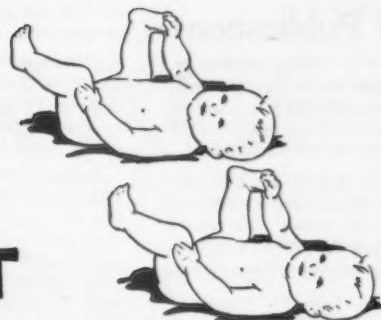
Leaders in the industrial field will discuss many phases of industrial

TABLE III
CUPOLA-MELTED GRAY IRON TREATED WITH VARIOUS ALLOYS IN LARGE LADLES

	Test D			Test E						
Ferrotitanium added, per cent.....	0.5	0.5	none	none	1.00	none	1.00	0.5	none	none
Titanium content, per cent.....	0.117	0.099	0.072	0.042	0.102	...	0.108	0.075	...	...
Chromium content, per cent.....	...	0.43	0.46	...	...	0.32	0.39	0.41	0.39	...
Other alloy content, per cent.....	...	...	0.9 Ni.	...	...	...	...	...	0.94 Ni.	0.19 Mo.
Silicon content, per cent.....	2.43	2.14	2.23	1.78	1.78	1.68	1.88	1.91	1.94	1.96
Graphite content, per cent.....	3.22	3.03	2.96	2.99	3.03	2.85	2.83	2.92	2.98	2.99
Combined carbon, per cent.....	0.48	0.65	0.56	0.50	0.49	0.64	0.67	0.60	0.56	0.49
Total carbon, per cent.....	3.70	3.68	3.52	3.49	3.52	3.49	3.50	3.52	3.54	3.48
Transverse strength, lb.....	3,722	4,258	4,192	4,115	4,500	4,340	4,628	4,560	4,448	4,428
Increase over untreated, per cent.....	...	...	...	...	9.4	5.5	12.5	10.8	8.1	7.6
Deflection, in.....	0.132	0.156	0.124	0.132	0.143	0.138	0.138	0.133	0.137	0.144
Tensile strength, lb. per sq. in.....	...	25,700	29,960	30,860	32,460	33,780	35,240	35,280	32,400	31,000
Increase over untreated, per cent.....	...	...	...	...	5.2	9.5	14.2	14.3	5.0	0.5
Brinell hardness at center.....	159	170	196	183	183	183	192	196	187	179
Brinell midway between center and edge...	170	179	202	187	187	192	196	207	179	183
Comparative resistance to cutting:										
Shaper test, 0.01 in. depth.....	...	58.0	59.0	53.0	55.0	...	53.0	...	55.0	55.0
Shaper test, 0.02 in. depth.....	...	86.0	87.0	85.0	86.0	...	84.0	...	87.0	86.0
Lathe test, 0.00313 in. feed.....	...	27.5	29.0	27.5	28.5	...	25.0	...	25.5	26.5
Lathe test, 0.00694 in. feed.....	...	40.0	40.0	39.5	43.0	...	38.0	...	39.5	39.5
Check lathe test, 0.00313 in. feed.....	...	23.5	25.0	22.0	26.5	...	22.5	...	22.5	24.0
Check lathe test, 0.00694 in. feed.....	...	37.0	38.0	36.0	40.0	...	36.0	...	39.0	37.0
Drill test, torque.....	...	18.0	18.5	18.0	17.5	...	18.0	...	18.5	17.5
Drill test, thrust.....	...	830.0	850.0	850.0	840.0	...	870.0	...	820.0	800.0

*Though they look
alike at first*

**TIME WILL TELL THAT
THERE */S* A DIFFERENCE !**



THERE IS A DIFFERENCE in small tools although it is practically true that they "all look alike at first." It is that difference which keeps the mechanical world so loyal to Morse drills, cutters, reamers, taps and dies.

Morse Tools can stand the test of long grueling metal cutting work. Their scientific temper and uniformly high quality of steel keep them at work long after other tools have had to go to the grinding wheel or the scrap heap.

Morse Tools actually lower production costs — that's the difference that counts today!

MORSE
TWIST DRILL & MACHINE COMPANY
NEW BEDFORD, MASS., U.S.A.

New York Store
92 Lafayette Street

Chicago Store
570 West Randolph Street



THE MORSE LINE INCLUDES: High Speed and Carbon

DRILLS REAMERS CUTTERS TAPS AND DIES SCREW PLATES ARBORS
CHUCKS COUNTERBORES MANDRELS TAPER PINS SOCKETS SLEEVES

New Trade Publications

Nolap is the title of a 4-page circular issued by Cleveland Container Co., 10730 Berea Road, Cleveland. It describes the application of Nolap abrasive sleeves to portable grinding tools for die, tool and production finishing.

Century Splash Proof Motors are described in a 4-page circular issued by Century Electric Co., 1806 Pine Street, St. Louis. Design of these motors affords protection from splash of liquids, falling or flying particles, dust, etc.

Hercules Underpinning Piles for Industrial Reconstruction, issued by Underpinning & Foundation Co., Inc., 155 East 44th Street, New York, is a folder showing some typical installations of the company's cylindrical steel and concrete pile columns.

Amsco is the title of an illustrated circular issued by American Manganese Steel Co., 389 East 14th Street, Chicago Heights, Ill. It describes the application of Amaco nickel manganese steel welding rod to the welding of manganese steel. The use of the Amsco No. 459 hard surfacing welding rod is also outlined in considerable detail.

Purite, made by the Mathieson Alkali Works, Inc., 250 Park Avenue, New York, is described in a circular issued by the company, which outlines the application of this material as a foundry iron cleanser. Another and more detailed new booklet on Purite has also been issued by the company and is entitled **Desulphurizing Cast Iron**.

Pickling Equipment.—Klaas Machine & Mfg. Co., 4313 East Forty-ninth Street, Cleveland. Folder covering pickling tanks, Monel metal pickling baskets and other equipment for the pickling department given the name Weaver.

Gearmotors.—Reliance Electric & Engineering Co., Ivanhoe Road, Cleveland. Bulletin 400, devoted to type S gearmotor, which is a combination of motor and speed reducer in a single unit.

Visual Presentations for Industrial Salesmen is a 22 page illustrated report issued by National Industrial Advertisers' Association. The practices of 26 companies representing a wide variety of products such as machinery, paints, soap, radios, lubricating oils, electric refrigerators, etc., are discussed. In many cases specimens of the materials are illustrated and the report indicates the results that were obtained. The report sells at 50c. per copy and may be obtained by writing to National Industrial Advertisers' Association, 537 South Dearborn Street, Chicago.

Electric Battery.—Brown Instrument Co., Philadelphia. Bulletin describing compensated

air cell for use with the Brown potentiometer to eliminate frequent standardizing.

Compressors and Pumps.—Worthington Pump & Machinery Corp., Harrison, N. J. Revised bulletins on compressors up to 360 cu. ft. per min. capacity and on a three-stage volute boiler feed pump.

Concrete Floors for Industrial Buildings and Concrete Floors—How to Build Them have been issued in two 4-page folders by Portland Cement Association, Chicago. A working "Specification for Bonded Concrete Floor Finish" has also been published and the Association's 24-page book "Concrete Floor Finishes," first issued in 1929, has been revised and reprinted.

Metal Packaging.—National Metal Edge Box Co., 332 North Twelfth St., Philadelphia. Monthly publication devoted to promoting modern packaging methods, featuring metal-edge package manufactured by the company.

Low Power Photomicrographic Equipment.—Bausch & Lomb Optical Co., Rochester, N. Y. Illustrated folder devoted to low power photomicrography with Micro-Tessars, which are short focus lenses for use when it is required to cover the largest possible area with a minimum curvature of field.

Gearmotors.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Bulletin describing various models of single and double reduction gearmotors, consisting of a simple all-external type speed reducer combined with a standard motor. Tables of output speeds are included. Another publication covers multispeed gearmotors ranging from ½ to 15 hp. and having four speed changes.

Electric Heat-Treating Furnaces.—H. O. Swoboda, Inc., 3530 Forbes Street, Pittsburgh. Bulletin No. 280 devoted to construction and advantages of Falcon electric furnaces, designed for continuous hardening, tempering and annealing operations.

Air Compressors.—Sullivan Machinery Co., 400 North Michigan Avenue, Chicago. Bulletin 88-D and 81-I devoted respectively to single-stage angle compressors for gas and air, and 8-in. stroke angle compressors.

The United States Department of Commerce has issued simplified practice recommendation R53-32 (second edition) covering steel reinforcing spirals and R57-32 covering wrought iron and wrought steel pipe valves and fittings.

A comparison of seven different kinds of pumping equipment is made in a paper by Paul Hansen, of Pearce, Greeley & Hansen, consulting engineers, Chicago, devoted to a water pumping station at Highland Park, Ill. A copy of the paper has been printed for general distribution by the De Laval Steam Turbine Co., Trenton, N. J. The lowest cost of pumping is

shown by a combination of steam-turbine pumps and electric-motor-driven pumps.

Pictorial presentation of the manufacture of wrought iron by the Byers process is made in a booklet recently published by the A. M. Byers Co., Pittsburgh, entitled "The New Story of Ancient Wrought Iron." Illustrations have been made from actual scenes taken from the company's motion picture of the same title. Copies of the booklet are available at the company's offices.

Pasche Airbrush Co., Chicago, has issued an attractively illustrated 4-page bulletin showing several different types of automatic air-finishing, air-coating and air-painting machines.

Trade Notes

Clark Tractor Co., Battle Creek, Mich., manufacturers of gas-powered industrial tractors and lift trucks, has appointed Harold B. Madison, 467 Canal Street, New York, branch manager in charge of its eastern interests. Mr. Madison has been with the company 12 years, and, as field engineer, has been in charge of surveys of material handling problems and installations.

Torchweld Equipment Co. has decided to move its offices and plant to larger quarters. The new location at 1035 West Lake Street, Chicago, will more than double the former floor space. New machinery and fixtures are being added.

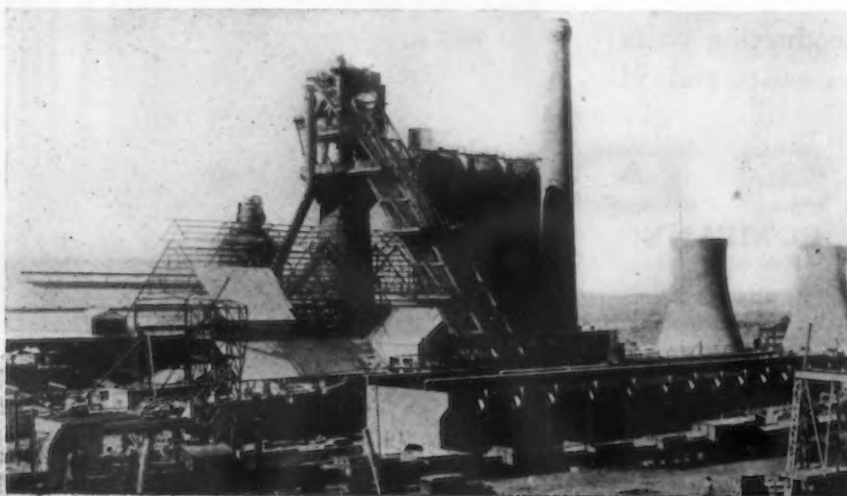
The firm recently announced a new line of welding and cutting equipment together with carbonic gas regulators to be used in connection with the dispensing of draught beer. A new price list will be issued about June 1.

B. F. Sturtevant Co., Hyde Park, Mass., has removed its Pittsburgh office from 1506 Park Building to 2635 Koppers Building. H. A. Lopez is sales engineer in charge.

Youcan Engineering Co., recently organized by G. P. Young and R. L. Constant, has taken space in the Norwood Power Building, Dayton, Ohio, for the manufacture of aircraft accessories and general engineering.

Bayley Blower Co. has moved from its former location, 1938 South Fourth Street, Milwaukee, to a new plant at 1817 South Sixty-sixth Street, West Allis, Wis. The present corporation was organized last November as a reorganization of the old Bayley Co., to continue the manufacture of the Bayley lines.

Perfection Cooler Co., Michigan City, Ind., has been absorbed by Geuder, Paeschke & Frey Co., Milwaukee. The business of the Cooler Co. will be continued as the Perfection Cooler and Dispenser Division.



BLAST furnace plant of the South African Iron & Steel Industrial Corp., Ltd. This 500-ton blast furnace plant, designed by Freyn Engineering Co. and constructed by Ashmore, Benson, Pease & Co., Ltd., the British associates of Freyn Engineering Co., is rapidly nearing completion at Pretoria, South Africa. The plant includes a modern by-product coke plant, part of which is shown at the extreme right of the illustration.